ADAPTATION FUND

AFB/PPRC.9/5
13 June 2012

Adaptation Fund Board
Project and Programme Review Committee
Ninth Meeting
Bonn, 26-27 June 2012

PROPOSAL FOR PARAGUAY

I. Background

1. The Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund, adopted by the Adaptation Fund Board, state in paragraph 41 that regular adaptation project and programme proposals, i.e. those that request funding exceeding US$ 1 million, would undergo either a one-step, or a two-step approval process. In case of the one-step process, the proponent would directly submit a fully-developed project proposal. In the two-step process, the proponent would first submit a brief project concept, which would be reviewed by the Project and Programme Review Committee (PPRC) and would have to receive the approval by the Board. In the second step, the fully-developed project/programme document would be reviewed by the PPRC, and would finally require Board's approval.

2. The Templates Approved by the Adaptation Fund Board (Operational Policies and Guidelines for Parties to Access Resources from the Adaptation Fund, Annex 3) do not include a separate template for project and programme concepts but provide that these are to be submitted using the project and programme proposal template. The section on Adaptation Fund Project Review Criteria states:

> *For regular projects using the two-step approval process, only the first four criteria will be applied when reviewing the 1st step for regular project concept. In addition, the information provided in the 1st step approval process with respect to the review criteria for the regular project concept could be less detailed than the information in the request for approval template submitted at the 2nd step approval process. Furthermore, a final project document is required for regular projects for the 2nd step approval, in addition to the approval template.*

3. The first four criteria mentioned above are:
   1. Country Eligibility,
   2. Project Eligibility,
   3. Resource Availability, and
   4. Eligibility of NIE/MIE.

4. The fifth criterion, applied when reviewing a fully-developed project document, is:
   5. Implementation Arrangements.

5. In its 17th meeting, the Adaptation Fund Board decided (Decision B.17/7) to approve "Instructions for preparing a request for project or programme funding from the Adaptation Fund", contained in the Annex to document AFB/PPRC.8/4, which further outlines applicable review criteria for both concepts and fully-developed proposals.

6. Based on the Adaptation Fund Board Decision B.9/2, the first call for project and programme proposals was issued and an invitation letter to eligible Parties to submit project and programme proposals to the Adaptation Fund was sent out on April 8, 2010.

7. According to the paragraph 41 of the operational policies and guidelines, a project or programme proposal needs to be received by the secretariat not less than nine weeks before a Board meeting, in order to be considered by the Board in that meeting.

8. The following project concept titled “Ecosystem based approaches for reducing the vulnerability of food production to the impacts of climate change in the Eastern and Chaco Regions of Paraguay” was submitted by the United Nations Environment Programme (UNEP), which is a Multilateral Implementing Entity of the Adaptation Fund. It was first submitted as a project concept, using the two-step approval process, for the 17th Adaptation Fund Board meeting, and was withdrawn following the initial review of the secretariat. Therefore, it was not considered by the Board for that meeting.

9. The current submission of the project concept was received by the secretariat in time to be considered in the 18th Adaptation Fund Board meeting. The secretariat carried out a technical review of the project proposal, assigned it the diary number PRY/MIE/Food/2012/1, and filled in a review sheet.

10. In accordance with a request to the secretariat made by the Adaptation Fund Board in its 10th meeting, the secretariat shared this review sheet with UNEP, and offered it the opportunity of providing responses before the review sheet was sent to the Project and Programme Committee of the Adaptation Fund.

11. The secretariat is submitting to the Project and Programme Review Committee the summary and, pursuant to decision B.17/15, the final technical review of the project, both prepared by the secretariat, along with the final submission of the proposal in the following section.

II. Project Summary

Paraguay – Ecosystem based approaches for reducing the vulnerability of food production to the impacts of climate change in the Eastern and Chaco Regions of Paraguay

Implementing Entity: *UNEP*
Project/Programme Execution Cost: USD 570,000
Total Project/Programme Cost: USD 6,570,000
Implementing Fee: USD 558,450
Financing Requested: USD 7,128,450

Project/Programme Background and Context: Paraguay is a landlocked country highly vulnerable to climate change, not only in terms of exposure and severity, but also due to the lack of adaptive capacity that is limited by several barriers. These barriers can be summarized as: i) information and knowledge gaps to address the adverse effects of climate change on rural populations, indigenous communities and other traditional communities, productive systems and ecosystems, ii) technical, operational and financial barriers to implement on-the-ground adaptation measures to ensure sustainable agricultural production and the resiliency of ecosystems and their services, and iii) institutional barriers to adequately address climate change adaptation issues.

The project **goal** is to reduce the vulnerability of the rural population (family agriculture producers) and indigenous communities of the Eastern and Chaco Regions of Paraguay to the impacts of climate change on their food production systems. This will be achieved through an agro-ecosystem approach that strengthens the resiliency of ecosystems to provide key ecosystem services to the production systems. In the project areas, these ecosystem services include, freshwater provision and regulation, protection against extreme weather events, flood regulation, climate regulation, prevention of the spread of alien species, nutrient cycling, and soil formation. The project presents the following three components:

Component 1: Knowledge management on vulnerability and resilience to climate change improved with tools and instruments to implement cost-effective adaptation measures;

Component 2: Adaptive capacity in rural areas of greatest vulnerability strengthened through concrete ecosystem services and agro-ecosystem based adaptation measures;

Component 3: Capacity development and awareness to implement and upscale effective implementation of adaptation measures at the national and local levels.

Component 1: Knowledge management on vulnerability and resilience to climate change improved with tools and instruments to implement cost-effective adaptation measures (USD 1,000,000)

This component will seek to remove barriers related to existing gaps in information and knowledge regarding climate change adaptation. The project will generate information and develop instruments to enhance the capacity of government agencies to better understand the requirements for adaptation to climate change and hence implement concrete actions in the field to help communities adapt. The tools and instruments to be generated under this

component will aim to support the piloting of specific “on-theground” climate change adaptation measures in the selected demonstration sites.

The project will carry out vulnerability studies and threats analyses on productive systems, ecosystems and populations in pilot areas in order to define strategies for ecosystem and community-based adaptation. These analyses will support the design of instruments under this component as well as the design and implementation of the pilot demonstrations under Component 2. An information and monitoring system for assessing agro-climatic risks will be developed with the MAG/UGR to identify and map climatic risks at a detailed and operational scale at the pilot sites and at the individual properties within the sites. Another activity of the project will be the development of a set of technical standards for forest protection and restoration, which currently do not exist in the country. The project will also seek collaboration with the IPTA, universities, NGOs, and the private sector, to expand research on crops and varieties resilient to climate variability, methods to control invasive species, and other issues that are of priority to family agriculture and indigenous peoples, as well as sustainable agricultural and natural resources management practices. Finally, the project will seek to develop supplementary instruments to strengthen adaptive capacity through feasibility studies on agricultural insurance for family agriculture, microcredit for small and medium sized scale investments for adaptation at the farm level, and incentives for small, medium and large-scale agriculture.

Component 2: Adaptive capacity in rural areas of greatest vulnerability strengthened through concrete ecosystem services and agro-ecosystem based adaptation measures (USD 4, 480,000)

This component focuses on the implementation of concrete adaptation actions that will increase adaptive capacity and ecosystem resiliency in targeted project areas within an ecosystem/agro-ecosystem approach. With the support of the studies and instruments to be developed under Component 1, the project will design and pilot the implementation of a set of targeted ecosystem-based activities (agricultural, forest, water management) to address climate change adaptation by the target groups in the selected sites, with a priority on family agriculture producers (*campesino* farmers, and other small farmers) and indigenous communities. These may include activities and practices such as:

- Conservation and restoration of forests and other ecosystems to protect or strengthen the vital services that they provide to the livelihoods of rural and indigenous communities;
- Community-based adaptation plans for communities in pilot areas that contain concrete actions for adaptation that strengthen ecosystem resiliency, as well as draw on climate resilient traditional and other natural practices;
- Exchange of traditional and other knowledge among stakeholders, training and awareness building in project intervention areas to implement key adaptation strategies; and
- Piloting of agriculture insurance, microcredit and incentive programs.

Outcome 3: Capacity development and awareness to implement and upscale effective implementation of adaptation measures at the national and local levels (USD 520,000)

The project will enhance stakeholder capacities enabling them to effectively respond to long-term climate change impacts. The project will design training programs suited to different government stakeholders including SEAM staff, policy-makers and other key stakeholders such as the departmental and municipal governments, universities and others. The expected results of these training programs will be increased awareness, suitable skills, more informed decision-making, and improved academic research to generate knowledge to properly address the problems posed by climate change. Likewise, the project will identify the specific training needs of the institutions (government, NGOs, private sector) that will develop and implement activities in the pilot sites within the scope of the project. On the basis of this assessment, the project will develop training programs to ensure that technical staff are adequately trained to implement the demonstration activities under Component 2, as well as developing and maintaining adequate working relations with the project target groups.

III. Project review sheet

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: REGULAR PROJECT CONCEPT

Country/Region: **Paraguay**
Project Title: **Ecosystem based approaches for reducing the vulnerability of food production to the impacts of climate change in the Eastern and Chaco Regions of Paraguay**
AF Project ID: **PRY/MIE/Food/2012/1**
NIE/MIE Project ID:
Requested Financing from Adaptation Fund (US Dollars): **$7,128,450**
Regular Project Concept Approval Date:
Anticipated Submission of final RP document (if applicable):
Reviewer and contact person: **Daouda Ndiaye**
Co-reviewer(s): **Minna Kononen**
NIE/MIE Contact Person: **Jason Spensley**

Review Criteria	Questions	Comments on May 11, 2012	Comments on May 24, 2102
Country Eligibility	1. Is the country party to the Kyoto Protocol?	Yes.	
	2. Is the country a developing country particularly vulnerable to the adverse effects of climate change?	Yes, Paraguay is vulnerable to extreme weather events, due to climate variability such as droughts, floods, and storms. These consequences have been reflected in food security, less water availability, and a larger number of wild fires.	
Project Eligibility	1. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	Yes. Endorsement letter dated April 13, 2012 is provided.	

	2. Does the project / programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?	Yes.	
	3. Does the project / programme provide economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations?	Yes.	
	4. Is the project / programme cost effective?	Yes. The ecosystem and community based approaches are believed to be more cost effective than heavy physical infrastructures. However, whereas participatory planning is very much encouraged, the full project proposal should include a pre-identified list of feasible "sub-projects" available to communities as well as estimated budget and clear indicators for implementing these adaptation activities. **CR1:** Please provide some indication of how the proposed adaptation activities will be carried out at the community level (how funds will be made available to communities). Also, provide more information on how these activities will be identified and prioritized. In addition to concrete adaptation activities in communities, Component 2 also includes piloting insurance, micro-credit and incentive programs. These will be based on the feasibility studies under Component 1. Without knowing the outcome of such studies, it is not realistic to assert that all these financial mechanisms will be piloted. **CR2:** Please clarify that the type of financial mechanism that will be piloted will depend on the results of the feasibility analysis in	**CR1:** Addressed. Please note that these possible partner NGOs should be pre-identified for the full proposal, and their value-added assessed.

		Component 1, and that they will be assessed for their cost effectiveness beforehand and hence all of them may not be piloted. Also, please note that at the full proposal stage a detailed budget will have to be provided and that the long list of activities provided under component 2 will have to be budgeted and the beneficiaries (number) or targeted area (ha) identified.	**CR2:** Addressed. The viability of these financial mechanisms could be addressed already in the full proposal by identifying previous experiences and possible barriers.
	5. Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national communications and adaptation programs of action and other relevant instruments?	Yes, the project is consistent with: - National Communications (1 and 2) - National Environmental Policy - CC policy - Paraguay's National Climate Change Policy - National Forest Policy - National Forest Action Plan	
	6. Does the project / programme meet the relevant national technical standards, where applicable?	Yes.	
	7. Is there duplication of project / programme with other funding sources?	No.	
	8. Does the project / programme have a learning and knowledge management component to capture and feedback lessons?	Yes. All three components present outputs that will support creating and exchanging knowledge, as well as capturing and disseminating lessons learned.	
	9. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations?	Yes.	
	10. Is the requested financing justified on the basis of full cost of adaptation reasoning?	Yes.	

	11. Is the project / program aligned with AF's results framework?	Yes. The project aligns with Outcomes 2 "Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses" and 5 "Increased ecosystem resilience in response to climate change and variability-induced stress" and their related outputs 2.2 "Targeted population groups covered by adequate risk reduction systems" and 5 "Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress".	
	12. Has the sustainability of the project/programme outcomes been taken into account when designing the project?	Yes. The concrete ecosystem and community based adaptation actions proposed by the project are accompanied with the relevant information and knowledge tools and feasibility studies and piloting of financial mechanisms that would help ensuring the sustainability of these actions. Also, the capacities of all stakeholders will be enhanced, for them to have better knowledge and skills related to climate adaptation.	
Resource Availability	1. Is the requested project / programme funding within the cap of the country?	Yes. The total requested budget is $7,128,450.	
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project/programme budget before the fee?	Yes. The IE fees are set at 8.5% of the total project budget.	
	3. Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget (including the fee)?	Yes. The requested execution costs are set at 8.68%	
Eligibility of NIE/MIE	4. Is the project/programme submitted through an eligible NIE/MIE that has been accredited by the Board?	Yes. UNEP is an accredited MIE.	

Implementation Arrangement	1. Is there adequate arrangement for project / programme management?	n/a (Not required at Project Concept stage).	
	2. Are there measures for financial and project/programme risk management?	n/a (Not required at Project Concept stage).	
	3. Is a budget on the Implementing Entity Management Fee use included?	n/a (Not required at Project Concept stage).	
	4. Is an explanation and a breakdown of the execution costs included?	n/a (Not required at Project Concept stage).	
	5. Is a detailed budget including budget notes included?	n/a (Not required at Project Concept stage).	
	6. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans and sex-disaggregated data, targets and indicators?	n/a (Not required at Project Concept stage).	
	7. Does the M&E Framework include a break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function?	n/a (Not required at Project Concept stage).	
	8. Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?	n/a (Not required at Project Concept stage). *Please note that as of the 14th AFB meeting, fully developed project/programme proposals are required to provide a table indicating alignment of project/programme objectives with the AF results framework. A template will be available on the AF website*.)	
	9. Is a disbursement schedule with time-bound milestones included?	n/a (Not required at Project Concept stage).	

Technical Summary	Paraguay is a landlocked country vulnerable to climate variability, with increasing flood, drought, storm and wildfire events.

	The proposed project seeks to reduce the vulnerability of smallholders' and indigenous peoples' food production systems in two targeted regions, to climate changes and variability, through the adoption of an ecosystem services/ agro-ecosystem approach. The project will achieve this through the following three components: 1. Knowledge management on vulnerability and resilience to climate change improved with tools and instruments to implement cost-effective adaptation measures; 2. Adaptive capacity in rural areas of greatest vulnerability strengthened through concrete ecosystem services and agro-ecosystem based adaptation measures; and 3. Capacity development and awareness to implement and upscale effective implementation of adaptation measures at the national and local levels. The project proposes concrete ecosystem and community based adaptation actions which are accompanied with the relevant information and knowledge tools, feasibility studies and piloting of financial mechanisms that would help ensuring the sustainability of these actions. Adaptation activities include the promotion of traditional farming practices, adapted crop varieties and agro ecological production that focuses on minimal external inputs, among other things. Also, the capacities of all stakeholders will be enhanced, for them to have better knowledge and skills related to climate adaptation. The initial technical review found that although the project concept has very well defined its approach through community-based ecosystem level adaptation and provides enough information at this stage, the proposal could describe in more detail the community-based mechanism, especially how funds will be made available to communities and how these activities will be identified and prioritized. Also, it was not clear if the implementation of the financial mechanisms that will be piloted will depend on the results of the feasibility analysis in Component 1, or if they will be assessed for their cost effectiveness beforehand. Consequently, the proponents were asked to clarify the above mentioned issues and others outlined in the initial review. A revised document was resubmitted to the secretariat, adequately addressing all the requested clarifications. The proponent should consider to address the following issues when submitting a full proposal: a) The possible partner NGOs for the implementation of subprojects should be pre-identified for the full proposal, and their value-added assessed; b) In order to demonstrate the project's cost effectiveness, the fully-developed proposal should

	prioritize among the number of adaptation activities identified under component 2 and revise the proposed outputs and outcomes accordingly, to include concrete, measurable results (such as increased agricultural productivity) rather than non-quantifiable outcomes; c) The fully-developed proposal should provide a budget for the activities identified under component 2 and describe the beneficiaries (number) or targeted area (ha) for these activities, when relevant.
Date:	May 24, 2012.

DATE OF RECEIPT:
ADAPTATION FUND PROJECT ID:
(For Adaptation Fund Board Secretariat Use Only)

ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

PROJECT/PROGRAMME CATEGORY:	REGULAR PROJECT
COUNTRY/IES:	PARAGUAY
TITLE OF PROJECT/PROGRAMME:	ECOSYSTEM BASED APPROACHES FOR REDUCING THE VULNERABILITY OF FOOD PRODUCTION TO THE IMPACTS OF CLIMATE CHANGE IN THE EASTERN AND CHACO REGIONS OF PARAGUAY
TYPE OF IMPLEMENTING ENTITY:	MULTILATERAL IMPLEMENTING AGENCY
IMPLEMENTING ENTITY:	UNITED NATIONS ENVIRONMENT PROGRAMME
EXECUTING ENTITY/IES:	ENVIRONMENT SECRETARIAT
AMOUNT OF FINANCING REQUESTED:	7,128,450 (IN U.S DOLLARS EQUIVALENT)

PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

General Context

Paraguay is a landlocked country bordered by Argentina, Bolivia and Brazil. The country's population is largely rural with 43% or 2.5 million of its 6.3 million inhabitants residing in rural areas[1]. The indigenous population represents 1.7% of the total population, distributed among 20 ethnic groups[2]. The country is divided by the Paraguay River in two distinct and unique regions. The Eastern Region, where more than 98% of the total population is concentrated, occupies 39% (159,827 km2) of the country´s area. The Western Region, or Chaco, covers the remaining 60.7% of the territory (246,925 km2) but sustains just 2% of the total population. Map 1 below shows the location of each region within the country.

[1] DGEEC 2009 Annual Statistical Yearbook
[2] DGEEC. 2010. Permanent Household Survey

Map 1. Natural regions of Paraguay

Paraguay's economy is dominantly based on agricultural production, which includes the export of soybean, beef, cotton, grains, timber and sugar. In 2010, the Gross Domestic Product (GDP) for the primary sector (agriculture, livestock, forestry, and fisheries) was 22% of the GDP, while the secondary sector (industry) accounted for 20% and the services sector for 47%[3]. The Paraguayan economy grew steadily between 2003 and 2008 at an average annual rate of around 5% as a result of a growing world demand for commodities, high prices and favorable weather conditions that supported the commodity based agricultural production. The 2008 drought reduced agricultural exports, slowed economic growth, and combined with the global recession, caused the economy to fall to -3.8% in 2009. The government introduced fiscal and monetary stimulus packages and in 2010 economic growth reached 15%, slowing down again to about 4% in 2011 as the stimulus subsided[4,5]. Growth for 2012 is expected to be reduced to 3.7% as the result of the drought affecting the agricultural sector and livestock sanitary issues that are reducing the regular export volumes[6].

In 2011, Paraguay's Human Development Index was 0.665 [7], occupying one of the last positions in South America. Currently, 34.7% of the total population (2.2 million people) lives in poverty, while 19.4% (1.2 million) live in extreme poverty[8]. In rural areas, 48.9% of the population, or approximately 1.3 million people, are considered poor[9], including the vast majority of the indigenous population, which are typically the most impoverished portion of the population and lack public services.

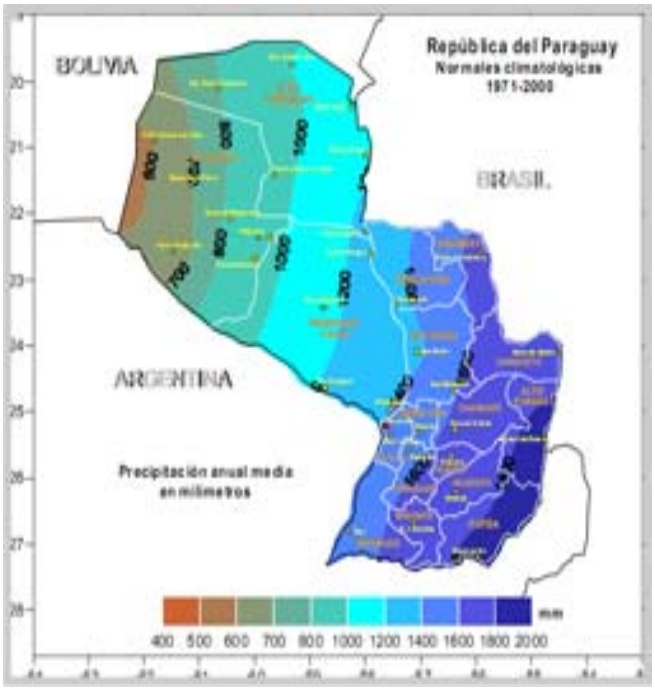
[3] Banco Central del Paraguay. 2011. Sistema de Cuentas Nacionales de Paraguay. Año Base 1994. Serie 2001-2010.
[4] Banco Central del Paraguay. 2011. Informe Económico Preliminar. Año 2011
[5] US Department of State. Background Note: Paraguay. http://www.state.gov/r/pa/ei/bgn/1841.htm#econ
[6] Banco Central del Paraguay. 2011. Informe Económico Preliminar. Año 2011
[7] UNDP. 2011. Human Development Report
[8] DGEEC. 2010. Permanent Household Survey
[9] DGEEC. 2010. Permanent Household Survey

Climate

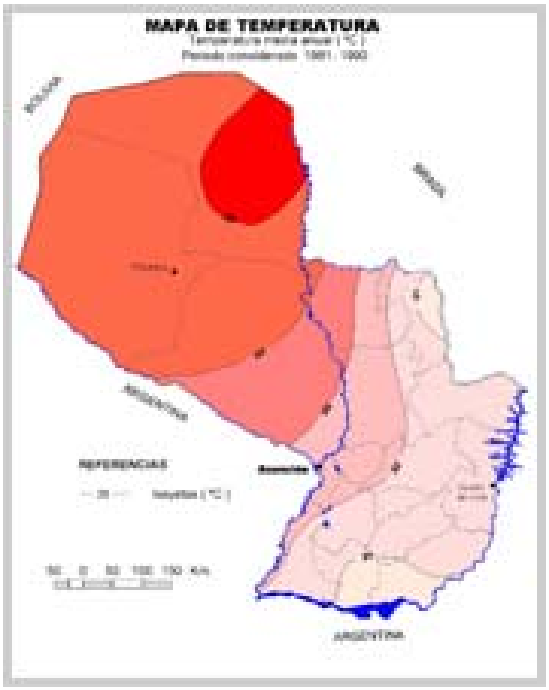
Current climate threats, variability and impacts

The climate of Paraguay presents great variability. It is semiarid in the Northeast of the Chaco varying to sub-humid and mega-thermal (warm) around the Paraguay River basin. The Eastern Region's northeast is semi humid, while the remaining part of this region is humid mesothermal (temperate). The mean annual temperature is 21ºC in the Southeast of the Eastern Region, and more than 25ºC in the Central and Northern Chaco, where the highest mean temperatures are recorded, reaching over 31ºC, and occasionally above 40ºC. The lowest minimum mean temperatures are recorded in the Eastern Region, around 15ºC. The distribution of precipitation is also variable, with the Chaco being much dryer receiving an annual rainfall of 400 mm in the Northwest Chaco to 1,600 mm in the Paraguay River basin, and the Eastern Region receiving more than 1,800 mm. Maps 2 and 3 below show the annual rainfall and temperature averages on the basis of historical data recorded since 1971.

Map 2: Precipitation Map



Map 3: Temperature Map



Source: http://www.camposparaguay.com.py/es/sobre_paraguay

The country experiences significant natural recurrent climatic events, including floods, droughts, storms and wildfires, which result in severe social, economic and environmental impacts at national and local levels. However, in recent years, the agriculture sector has suffered serious problems in maintaining production levels due to larger than normal irregularities in rainfall patterns, increased frequency and intensity of droughts and periods of excess humidity, which are beyond the typical cyclical climate variability of the country. This has had severe impacts on the livelihoods of the rural

population, especially smallholders and indigenous peoples, since the recovery from losses in agricultural production may take several cycles of agriculture production[10].

The National Emergency Secretariat´s (SEN) 2010 Country Document II on disaster risk management in Paraguay states that the declared and undeclared emergency situations have increased significantly in the country during the last few years due to extreme weather events, including floods, droughts and forest fires, strong storms with intense rain and gush winds[11]. For example, the 2008-2009 drought, affected more than 22,000[12] families in the Chaco, most of them peasants and indigenous communities who suffered from a lack of water availability. In the Eastern Region this drought affected up to 75,000 families and soybean yields decreased by 43% with respect to the previous year[13,14]. Other examples include the wildfires of 2007, which registered more than 5,000 fire spots; making it the highest ever recorded and affected more than 50,000 families in the Eastern Region[15]. In 2009, a severe storm in the Northern part of the Eastern Region destroyed over 1,800 hectares of staple crops and more than 9,000 families were affected by loss of crops and damage to their homes[16]. The 2011-12 ENSO-La Niña event caused a drought throughout the country reaching critical levels in the North and South of the Eastern Region, severe levels in the East of the same region, and moderate levels in the Chaco[17]. Losses ranging between 30% and 50% of the total surface area of crops have been estimated in the Eastern Region affecting 134,000 smallholder and 26,000 indigenous families[18,19].

The SEN has cross-referenced the most significant events indicating the year and location of their occurrence (Map 4).

Map 4: Significant events, year and location of occurrence

[10] UNDP. 2007. Climate Change in Paraguay: risks, vulnerability and challenges

[11] National Emergency Secretariat. 2010. Country Document II: technical report on disaster risk management in Parguay

[12] UNDP. 2008. Drought in the Chaco. Assessment Mission 15-18/09/08.Final Report

[13] UNDP. 2007. Climate Change in Paraguay: risks, vulnerability and challenges.

[14] International Federation of Red Cross and Red Crescent Societies. DREF Operation Update. Paraguay: Drought. 13 July 2009

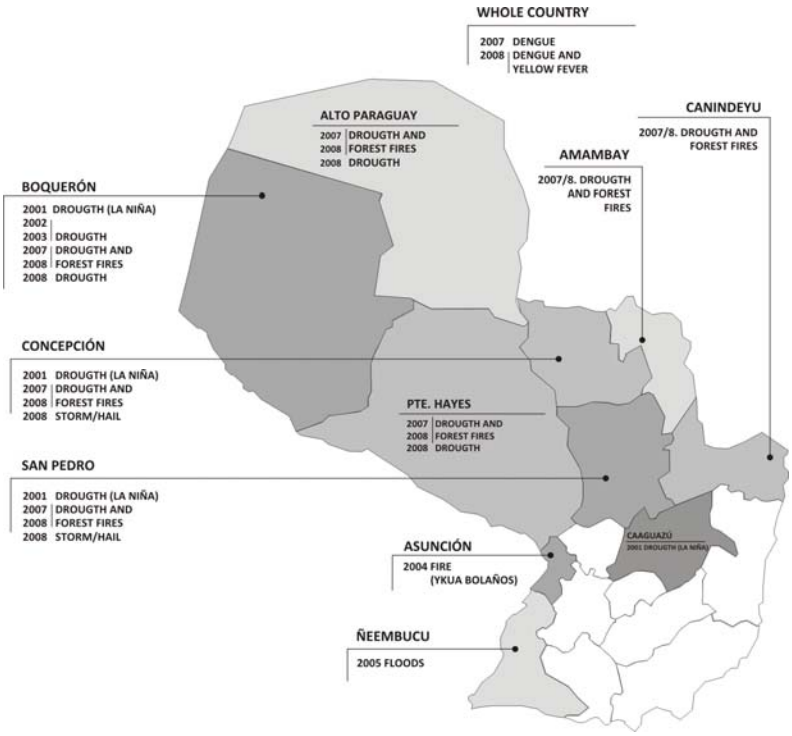
[15] UNDP. 2007. SEE: “Report of assistance – Drought and Fires Emergency”. National Emergency Secretariat

[16] International Federation of Red Cross and Red Crescent Societies. DREF Final Report. Paraguay: Wind and Hail Storm. 29 May 2009.

[17] The Ministry of Agriculture and Livestock classifies droughts as being: (i) moderate when there is no rainfall for more tan 15 days coinciding with the beginning of the crops´ reproduction cycle, (ii) severe, when there is no significant rainfall above 10 mm for more tan 20 days, and (iii) critical when there is no rainfall above 20 mm for more tan 30 days

[18] Ministerio de Agricultura y Ganadería. Informe preliminar sobre la sequía que afecta al sector agropecuario/zafra 2011/2012. http://www.mag.gov.py/index.php?pag=not_ver.php&tit=Boletin%20informativo...&idx=935761

[19] Cruz Roja Paraguaya. Reporte de Situación (26-01-12). Emergencia por Sequía en Paraguay: Declaratoria de Emergencia Alimentaria a la Producción de Alimentos de la Agricultura Familiar Campesina e Indígena



Source: SEN. Country Document II: technical report on disaster risk management in Paraguay. 2010

As stated in SEN´s Country Document, vulnerable populations are already experiencing the consequences of climate change, which are reflected by an increase in frequency and intensity of these events in the country threatening their food security and water availability.

Anticipated climate change and its impacts

Historical records from various meteorological stations taken between 1947 and 1999 demonstrate that during the 20th century, Paraguay recorded trends in temperature that are consistent with a general warming, especially during the evenings [20,21]. Precipitation records for the same time period show increases in rainfall and a tendency for intense rainfall events in shorter periods of time, combined with a increase in frequency of consecutive dry days [22,23].

Future climate scenarios estimated in the 2nd National Communication for different socio-economic conditions predict increases in temperature of approximately 1ºC until 2020, and between 2-2.5ºC until 2050. The geographical areas where the greatest increase in temperature is likely to occur are in the North and Northeast parts of the country (Paraguay River basin) as well as the Southeast of the Eastern Region.

[20] Intergovernmental Panel on Climate Change. 2007. IPCC Fourth Assessment Report: Climate Change 2007. Working Group II Report "Impacts, Adaptation and Vulnerability"

[21] Vincent, L.A. et al. 2005. Observed Trends in Indices of Daily Temperature Extremes in South America 1960–2000

[22] Intergovernmental Panel on Climate Change. 2007. IPCC Fourth Assessment Report: Climate Change 2007. Working Group II Report "Impacts, Adaptation and Vulnerability"

[23] Haylock, M.R. 2006. Trends in Total and Extreme South American Rainfall in 1960–2000 and Links with Sea Surface Temperature

Changes in rainfall patterns between 2020 and 2050 vary highly depending on the climatic model used; nevertheless in general terms, the West and Northeast of the country are likely to experience a decrease, while increases may be recorded to the North, East and mainly Southwest of the Eastern Region (Parana River basin) (See maps in annexes).

Limited information is currently available on future climate scenarios for Paraguay, and much of the information outlined above is drawn from Paraguay's 2nd communication to the UNFCCC. However, a climate change vulnerability and impact assessment is currently being conducted in the Chaco region, through the UNEP Project "Mainstreaming of climate change adaptation measures into the national development processes in Latin America and the Caribbean – REGATTA", with funding provided by the government of Spain. This analysis will be completed by the end of 2012, and information from it will be used in the project to help define specific actions.

Based on the available climate scenarios, the 1st and 2nd National Communications have described the threats likely to be posed by climate change on the country´s two distinct regions:

Eastern Region: The Eastern Region is relatively flat with some mountain ranges up to 840 meters above sea level. Land is fertile with a high percentage suitable for agricultural production and the availability of both surface and subsurface waters. Approximately half of the Eastern Region lies over the *Guarani* Aquifer, one of the most important worldwide and there are other minor aquifers located in different areas of the region as well. The average annual rainfall ranges from 1,400 to 1,800 mm, which favors both agriculture and livestock production. Crops occupy some 3.3 million hectares. The high deforestation rates in the Eastern Region during the last decades have threatened the quality and accessibility to ecosystem services (e.g. quantity and quality of water, timber, fuel-wood, soil fertility, non-timber forest products, etc.), further exacerbating the impacts of climate variability on food production systems.

The following climate threats have been identified for the Eastern Region[24]:

- Variation in rainfall patterns (longer periods between rains and greater intensity in a short time).
- Increase in temperature (greater number of days with higher temperatures and longer dry periods).
- Increase in wildfires.

Impacts of these climate threats are likely to be felt in several sectors, including agriculture, ecosystems and biodiversity, and water resources, including:

- Variations in temperature and precipitation will likely affect the remaining forests and other ecosystems, favoring certain species while harming others, inducing migrations and increasing diseases, all of which will likely result in further losses of biodiversity. This in turn will reduce the resiliency of the ecosystem and the provision of ecosystem services. An increase in wildfires associated with longer

[24] Secretaría del Ambiente. 2011. Segunda Comunicación Nacional. Cambio Climático Paraguay.

and more frequent droughts will also affect ecosystems and productive activities[25,26].

- The variations in rainfall patterns may negatively affect the recharge of aquifers, thereby reducing the availability of subsurface water resources. This issue, coupled with the over-use of underground water resources may induce water shortages, especially for human consumption[27].

- As a consequence of the changes in temperature and the distribution of rainfall patterns, the cycles of crop production will likely be altered, making it harder to predict reliable yields for producers. For instance, vulnerability assessments carried out under different future climate scenarios for selected crops (cotton, sesame, beans, manioc, sugarcane, soybean, maize and wheat) and livestock production concluded that in all cases (except manioc) there will likely be significant yield losses due to effects of climate change[28].

Communities will be affected both in terms of availability of food for consumption, and economically by having less certainty on their productive activities. Predicted yield losses will worsen the already difficult and vulnerable scenario, especially for small producers. Agricultural production will be directly impacted and the consequences will likely trickle down to affect food distribution, availability and prices for both rural and urban areas. Climate change effects on production systems will also translate into increased poverty, and reduce socio-economic opportunities to improve the livelihoods of the rural communities. This can deepen the migration trends to urban centers, and/or further deforestation and degradation of forests with negative impacts to the environment. This situation can increase the vulnerability of not only the small producers including *campesinos* and other rural communities, but also indigenous groups.

***Chaco*:** The Chaco is a great plain with relatively few areas that are suitable for agricultural production due to the low rainfall averages (500 to 1,000 mm per annum). As a result, only 23,000 hectares of land are under crop cultivation. Livestock production is the main economic activity (4.4 million heads of cattle), with the exception of the Central Chaco area where the Mennonite colonies also carry out industrial activities. Currently, there is an increasing trend in livestock production, with impacts on the environment, including enhanced deforestation and road construction. Extreme temperatures, ranging from high temperatures in the summer and low temperatures in the winter, characterize the climate of the Chaco. Rainfall occurs mainly during the summer months while droughts are predominant in the winter.

The following climate threats have been identified for the Chaco[29]:

- Increase in temperature

[25] Secretaría del Ambiente. 2011. Segunda Comunicación Nacional. Cambio Climático Paraguay
[26] UNDP. 2007. Climate Change in Paraguay: risks, vulnerability and challenges
[27] UNDP. 2007. Climate Change in Paraguay: risks, vulnerability and challenges
[28] Scribano, R., Molina, A. Estudio de la Economía del Cambio Climático en Sudamérica. Consultoría de Análisis Sectorial Agropecuario. Paraguay. 2010
[29] Secretaría del Ambiente. 2011. Segunda Comunicación Nacional. Cambio Climático Paraguay.

- Increase of drought events
- Increase in wildfires

Impacts of these climate threats are likely to be felt in several sectors in a number of different ways, including:

- According to the projected climate change scenarios for Paraguay, the dry areas of the Chaco will get drier and hotter. Although drought events in the Chaco are a cyclical phenomenon they are predicted to become more severe and unpredictable in the future. This is likely to result in enhanced desertification, soil degradation, disappearance of native species, and wild fires. In order to maintain production, the use of agro-chemicals is likely to increase, further contaminating soil and subsurface water resources[30,31].

- A high percentage of water resources in the Chaco have their origin from the summer rainfalls in the Andes Mountains. The areas along the Paraguay River will likely experience both increases in temperature and rainfall. This combination would increase the vulnerability of the ecosystems in these areas during the drought periods, since the high temperatures will increase the evapotranspiration rates of plant species; therefore increasing the possibility of disappearance of species that are vulnerable to droughts. Increases in rainfall will augment soil saturation, which would result in increased salinization[32].

- The overall availability of water in the Chaco is low and subsurface waters have limited use due to their high salinity content. Water for human consumption and economic activities (livestock production and irrigation) is stored in reservoirs. Increases in temperature will likely produce faster evaporation rates of water from these reservoirs. Water consumption needs for livestock production will also likely increase due to higher temperatures. Higher temperatures will increase evapotranspiration rates in soils, reducing their capacity to retain water resulting in rapid losses of soil humidity; all these factors will likely result in droughts appearing within shorter periods of time[33,34].

- The higher forecasted mean temperature and lower rainfall in the drier areas of the Chaco will also impact the biodiversity in this area. Species endemism is greater in areas with high temperatures, greater evaporation rates and low rainfall[35]. One potential effect of climate change can be a disruption of the breeding cycles of many species of fauna, especially birds and other pollinators, which contribute to the dissemination of seeds and pollination during rainy periods, thus affecting the overall balance and resiliency of ecosystems. This could be worsened by an increase in wildfires during periods of high temperatures and longer droughts.

[30] Secretaría del Ambiente. 2011. Segunda Comunicación Nacional. Cambio Climático Paraguay
[31] UNDP. 2007. Climate Change in Paraguay: risks, vulnerability and challenges
[32] Secretaría del Ambiente. 2011. Segunda Comunicación Nacional. Cambio Climático Paraguay
[33] Secretaría del Ambiente. 2011. Segunda Comunicación Nacional. Cambio Climático Paraguay
[34] UNDP. 2007. Climate Change in Paraguay: risks, vulnerability and challenges
[35] Secretaría del Ambiente. 2011. Segunda Comunicación Nacional. Cambio Climático Paraguay

- The impacts on ecosystems and biodiversity will pose further constraints on food production systems for both crop and livestock production. Degraded ecosystems signify less vital natural resources available to all communities in terms of production and water availability. Fragile and degraded ecosystems with less biodiversity will increase the vulnerability of all communities, especially indigenous communities, which depend highly on them for source of wood for housing and fuel, traditional medicines, non-timber products for food (e.g. wild honey harvesting), and maintaining their traditional ways of life. Higher temperatures and longer periods of droughts will worsen the overall condition of all communities, and directly increase their vulnerability and reduce their ability to adapt to the effects of climate change.

Overview of the Agricultural Sector and Food Production

Paraguay´s 1st and 2nd National Communications to the UNFCCC have recognized the high vulnerability of the agricultural sector to climate variability and the adverse effects of extreme events, taking into account the following factors:

- Approximately 1.4 million people, who represent 23% of the total national population, are dependent on the primary sector[36] (agriculture, forestry, livestock), which is highly dependent on climate and quality of ecosystems. In fact, the Paraguayan economy is based on the primary sector, which accounts for 24% of the GDP, employs 37% of the economically active population and contributes to 90% of the exports[37]. Within the primary sector, agriculture represents 60% of the sectorial GDP[38]. Furthermore, both the secondary and tertiary sectors are highly dependent on the primary sector (manufacturing of vegetable oil represents 15% of the industry sector and 60% of transportation services revolve around agriculture); therefore around two thirds of the GDP is in practice related to the primary sector.

  Table 1 below shows the structure of Paraguay´s GDP and its changes between the years of 2006 and 2010.

  Table 1: Sector contribution to the structure of the GDP for the period 2006-2010 (%)

Sectors	2006	2007	2008	2009	2010
Primary	13	17	22	17	24
Secondary	13	15	18	18	22
Tertiary	33	37	43	44	50

  Source: Banco Central del Paraguay. 2011. Sistema de Cuentas Nacionales de Paraguay. Año Base 1994. Serie 2001-2010.

  Table 2 below shows the breakdown of the primary sector and the contribution of each subsector.

[36] Ministry of Agriculture and Livestock. 2008 National Agricultural Census
[37] Central Bank of Paraguay. 2010. National Accounts.
[38] Ibíd.

Table 2: Primary sector breakdown for the period 2006-2010 (%)

Sectors	2006	2007	2008	2009	2010
Agriculture	56	62	63	56	60
Livestock	34	29	29	35	33
Forestry	6	6	5	6	5
Fisheries	4	3	3	3	2

Source: Banco Central del Paraguay. 2011. Sistema de Cuentas Nacionales de Paraguay. Año Base 1994. Serie 2001-2010.

- Development of the sector has been highly dependent on land use change, which has been responsible for significant changes in the country´s forest cover over the last several decades. The forest cover of the Eastern Region has been reduced from 55% of the surface area in the 1940s to 24% in the 2000s, (6.7 million hectares)[39]. In the Western Region or Chaco, forest cover has suffered a reduction of 7% (1.15 million hectares) between the 1990s and 2000s[40]. This situation has led to a deterioration of ecosystem services that constitute the basis for the maintenance of sound productive systems (e.g. soil stability, provision of nutrients, quantity and quality of water, biodiversity, others) in the case of family agriculture and provision of food and other resources for indigenous communities. This problem has increased Paraguay´s status as a country vulnerable to the impacts of climate change.
- Deforestation also causes changes in the local microclimate, resulting in an increase in temperature, enhanced evapotranspiration rates and reduced precipitation[41]. This relationship is supported by studies linking enhanced malaria rates with changes in temperature and precipitation in areas of land-use change, including Paraguay[42,43]. The warmer and dryer climate combined with the use of fire to clear land for agriculture pose an even greater threat to the remaining forest and the provision of ecosystem services[44]. Changes in the local climate also have implications for agricultural productivity, potentially reducing yields and causing further clearance of forested areas in order to maintain production levels[45].
- The 2008 Agricultural Census registered more than 281,000 small and medium sized holders throughout the country, which represent 94% of the total number of farms, who are comprised within the category of family agriculture[46]. Small holders

[39] Environment Secretariat. 2009. UN-REDD National Joint Programme
[40] Ibíd.
[41] Bala et al.,(2007) Combined Climate and Carbon-Cycle Effects of Large-Scale Deforestation."
[42] Pascual.et al (2006). Malaria resurgence in the East African highlands: temperature trends revisited. *Proceedings ofthe National Academy of Sciences of the United States of America*, 103(15): 5829-5834.
[43] Wayant, N,M.(2011). Spatio-temporal Analysis of Malaria in Paraguay. University of Nebraska Lincoln.
[44] Cochrane, M.A. (2001). In the Line of Fire: Understanding the Impacts of Tropical Forest Fires. *Environment*, vol. 43, no. 8, p. 28.
[45] Gorte, R.W and Sheikh, P.A. (2010). Deforestation and Climate Change. Congressional Research Service
[46] Family agriculture in Paraguay has been defined as the productive rural activity carried out mainly by family members who live in the property or a nearby community, and does not use a surface area greater tan 50 hectares in the Eastern Region or 500 hectares

between 1 and 50 hectares represent 84% or 264,000 people. Of this total some 241,000 small holders have between 1 and 20 hectares representing the so-called *campesino* farmers, which are the producers with the smallest surface areas. The majority of the family producers are located in the Eastern Region.

Table 3: Number of farms and surface area

Size of farms	Number of farms	Surface area (has)
< 1 to 20 has	241,182	1,340,095
20 to 50 has	22,865	619,986
50 to 100 has	6,879	459,555
100 to 500 has	10,485	2,398,794
> 500 has	7,464	26,268,464
Total	288,875	31,086,894

Source: 2008 Agricultural Census

- The main land use is dedicated tocrop cultivation (11% of the total surface area), livestock production (57% of the surface area) and forests (24% of the total surface area), as seen in Table 4 below.

Table 4: Land uses

Size of farms	Total surface area (has)	Crops (has)	Livestock (has)	Forests (has)	Fallow lands (has)	Other uses (has)
< 1 to 20 has	1,340,095	594,349	280,745	128,676	176,212	160,113
20 to 50 has	619,986	182,927	254,199	80,419	59,227	43,214
50 to 100 has	459,555	146,758	222,053	50,514	17,005	23,225
100 to 200 has	699,257	238,827	339,480	81,668	13,408	25,874
200 to 500 has	1,600,537	469,613	811,692	244,989	21,614	52,269
> 500 has	26,367,464	1,732,729	15,929,420	6,891,188	184,677	1,629,450
Total	31,086,894	3,365,203	17,837,589	7,477,454	472,143	1,934,505
%	100%	11%	57%	24%	2%	6%

Source: 2008 Agricultural Census

- According to the Ministry of Agriculture and Livestock, family agriculture contributes significantly to the production of staple foods, such as maize (20-90%; depending on varieties), legumes (93%), manioc (93%), sugar cane for industrialization (52%),

in the Western Region (Chaco). It should be noted that within family agriculture there are several different communities, including *campesino* farmers (1-20 hectares), other small rural producers with larger surface areas (including for example mennonites and other minority groups) and indigenous communities engaged in agriculture.

peanuts (37%), sesame (89%), banana (93%), pineapple (97%), and milk (54%) [47]. Therefore, this social group is particularly important for food sovereignty and security.

Table 5: Main family agriculture crops and cultivated area

Size of farms	Total cultivated area with crops	Surface area of main crops cultivated by family agriculture (has)						
		Cotton	Maize	Sugarcane for industry	Manioc	Peanuts	Beans	Sesame
< 1 to 20 has	594,349	53,831	172,005	34,184	143,533	12,497	47,489	53,331
20 to 50 has	182,927	6,500	53,948	10,680	17,689	1,389	4,691	7,205
50 to 100 has	146,758	1,029	42,449	3,750	3,533	417	864	1,329
100 to 200 has	238,827	545	60,440	2,290	1,579	966	424	1,004
200 to 500 has	469,613	410	120,720	3,438	1,521	4,313	482	2,247
> 500 has	1,732,728	3,941	407,910	27,489	2,839	4,530	1,473	4,741

Source: 2008 Agricultural Census

- Indigenous groups are characterized by living in communities, having a low availability of land, and carrying out agriculture and livestock production for subsistence, and traditional practices such as hunting and gathering activities, and their main source of income is derived from the occasional wage labor carried out outside of their communities.
- Family agriculture faces several constraints that affect its production capacities, namely, a strong dependence on rain-fed agriculture, soil degradation due to its prolonged use and insufficient soil management and conservation practices, and limited access to technical, financial, and training assistance on productive management, and market information. Small holders and indigenous peoples are especially vulnerable to the impacts of climate variability due to the above factors and their limited adaptive capacity. The low level of crop diversification greatly increases their vulnerability to climatic risks. These factors combined will hinder the opportunities for improving their livelihoods, and in the context of a changing climate will worsen in the long term.
- The expansion of large-scale agribusiness (soybean and other cash crops in the Eastern Region and pastures (livestock) in the Chaco) has led many poor small holders to sell their lands and either change their occupation or migrate to other rural or urban areas.
- The quality of ecosystems services on which agriculture depends on (soil and water) are threatened by deforestation and degradation of forests, and contamination by indiscriminate use of agro-chemicals and the lack of control of these products during their life cycle, especially in the Eastern Region. Likewise, availability of water in drought prone areas such as the Chaco affects agricultural production.

[47] Ministerio de Agricultura y Ganadería. 2010. Programa de Fomento de la Producción de Alimentos por la Agricultura Familiar

- There is a low level of institutional, financial, human, and technical capacity to address these issues.

Institutional, Policy and Regulatory Framework

In 2000, the National Environmental System (SISNAM) was established through Law 1561/2000. The SISNAM provides an organizational framework comprising of two levels; The National Environmental Council (CONAM) provides the platform for consultation, debate and definition of the national environmental policy, and the **Environment Secretariat (SEAM)** regulates the operation of the institutions in charge of elaboration, normalization, coordination, execution and control of the environment.

SEAM approved the National Environmental Policy (PAN) in May 2005. The objective of the PAN is to conserve and manage the use of Paraguay´s natural and cultural heritage in order to guarantee sustainable development, equal benefit-sharing, environmental justice and the livelihoods of the population. SEAM also created the National Climate Change Program and established the National Climate Change Commission. In 2011 the National Climate Change Policy (PNCC) was approved; its objective is to mainstream climate change issues at the national level and promote the implementation of coordinated measures that aim at developing an adequate approach that is coherent with the national development priorities and international commitments. SEAM also prepared the 1st and 2nd National Communications to the UNFCCC. SEAM is the implementing authority of several environmental laws, such as Law 251/1993 that ratifies the UNFCCC, Law 2524/2004 “Cero Deforestation in the Eastern Region”, Law 294/1993 “Environmental Impact Assessment”, Law 352/1994 “Protected Areas”, Law 3001/2006 “Environmental Services”, and Law 3239/2007 “Water Resources”.

SEAM coordinates actions with a number of other government institutions at the national level. Among these, key institutions dealing with climate change, risk management, natural resources management and agriculture are:

- The **Ministry of Agriculture and Livestock (MAG)** is charged with the mandate of promoting sustainable agrarian development for the improvement of the livelihoods of the population. The MAG has elaborated its Agrarian Strategic Framework 2010-2018, which prioritizes food security for family agriculture and indigenous peoples. They are implementing two flagship programs to meet these objectives: the National Program to Support Food Production by Family Agriculture (PPA) and the National Program for Indigenous Peoples´ Economy and Agriculture (PAEI). The PPA is a 10 year program (2010-2020) that focuses efforts and resources to diversifying the foods produced by family agriculture for both family consumption and for the market, seeking to improve the populations’ nutrition, livelihoods and the local economy. The PAI seeks to help indigenous people in increasing their production of both staple and cash crops taking into account their culture and traditions, and the conservation of natural resources, biodiversity and habitat. The MAG has also established a Risk Management Unit that deals with monitoring climate variability in agriculture.
- The **National Forest Institute (INFONA)** was established in 2008 through the Law 3464/08 as an autonomous institution and replaced the former National Forest

Service as the institution in charge of the forestry sector. The National Forest Policy was agreed on in 2002, and approved in 2010; its overall objective is to improve the contribution of the forestry sector to the sustainable economic growth of Paraguay through institutional strengthening, improvement of the legal framework, sustainable forest management, afforestation and reforestation, financing and incentives, industry competitiveness, control, research, capacity building and awareness raising. INFONA is responsible for Law Nº 422/1973 of Forests and Law 4241/2010 "Restoration of protective forests of waterways in the Eastern Region and conservation of forests in the Western Region (Chaco)".

- The **National Emergency Secretariat (SEN)** is in charge of coordinating the National Risk Reduction System comprising public and private interventions in risk reduction and emergencies; it has conducted studies identifying the climate, social and economic vulnerabilities of geographic areas and populations of the country, which will be of use to this project.
- The **Meteorology Directorate (DM)** is in charge of weather forecasts as well as carrying out climate related studies (e.g. climate modeling and scenarios).
- The **National Institute for Rural Development and Lands (INDERT)** is the implementing authority of the Agrarian Code and is mainly in charge of small farmers´ agricultural settlements and land tenure issues.
- The **Indigenous Peoples´ Institute (INDI)** is in charge of the Indigenous Peoples´ policy and its activities are mainly aimed at supporting communities in land tenure issues.

Two additional policy instruments that have been developed by the Government of Paraguay are: i) the National Plan for Food and Nutritional Security and Sovereignty (PLANAL) approved in 2009 with the goal of providing a response to child hunger and chronic malnutrition, and ii) the Public Policy for Social Development (PPDS) approved in 2010 that provides a shared vision of the development model for the country, emphasizing social issues and institutional arrangements to increase the impact of public interventions in the most vulnerable sectors.

Strategies that strengthen the capacity of society to address climate change are necessary, and the Government has made progress in doing so, such as the establishment of the National Climate Change Commission, the National Climate Change Office, and the National Climate Change Programme, elaboration of the National Climate Change Policy and preparation of the national communications. However, the issue is still in its early stages in regards to the development and implementation of national policies and applicable programs towards adaptation to climate change. Therefore, greater effort is needed to achieve institutional strengthening and financial and technical skills are required to provide a response to the challenges posed by climate change.

Nevertheless, the existing policy and legal framework are the strengths for the implementation of the AF project. The project will support the Government of Paraguay in its efforts to adapt to the impacts of climate change on food production systems and

will build upon the existing frameworks to ensure successful implementation and mainstreaming of experiences and lessons learned on adaptation.

Problem to be addressed

The project seeks to address the negative impacts that the forecasted variations in temperature and precipitation will have on the agricultural sector due to the greater number of warmer days, longer dry periods and increase in drought events, greater intensity of rains in a shorter time period, and increase in wildfires. These climate threats will increase the vulnerability of the rural population, especially for family producers and indigenous peoples. This is exacerbated by the following underlying drivers of vulnerability: i) strong dependence on rain-fed agriculture; ii) soil degradation due to prolonged use and insufficient soil management and conservation practices; iii) high poverty levels; and iv) deforestation and degradation of forests.

The proposed project will address specific climate threats in each one of the country´s two regions. These threats include variations in temperature and rainfall patterns, and increasing extreme weather events (droughts, storms) in the Eastern Region, and the increasing severity of droughts in the Chaco, as detailed in the Table 6 below. The 1st and 2nd National Communications have concluded that these threats are likely to increase land degradation in the Eastern Region and both land degradation and desertification in the Chaco. This will have particularly severe impacts on the most vulnerable populations within the agricultural sector of Paraguay, namely family agriculture producers and indigenous communities, who will be the project´s target population.

Table 6. Climate threats to be addressed by the Project

Eastern Region	Chaco
1. Variation in rainfall patterns (longer periods between rains and greater intensity in a short time) 2. Increase in temperature (greater number of days with higher temperatures and longer dry periods) 3. Increase in wildfires	1. Increase in temperature 2. Increase of drought events 3. Increase in wildfires

Project Approach

This project will strengthen the adaptive capacity of the rural population and indigenous communities by reducing the vulnerability of their food production systems to a changing climate. The project will adopt an **agro-ecosystem approach within the productive landscape** to reduce the vulnerability of food production systems in the Eastern and Chaco regions of Paraguay. For the purpose of this project, an agroecosystem is defined as a managed and natural landscape consisting of three interacting sub-systems: (i) productive agriculture; (ii) semi-natural or natural habitats with limited or subsistence human activity; (iii) and settlements and infrastructures. An agroecosystem produces food and fiber, which is dependent on the wider landscape that includes the surrounding ecosystems and the services they provide for this

production. An agroecosystem approach recognizes the strong interlinkages between maintaining healthy ecosystems for the provision of their services, which are vital to agricultural production. It is a management system and a set of practices that ensures agricultural production without causing harm to the surrounding ecosystems, so that they may continue to provide the ecosystem services that are critical to agricultural production, and thereby reduce vulnerability to climate change. Research shows that there is a strong link between sustainable agricultural and enhanced food production. For example, in an evaluation of 286 agriculture projects that transitioned to an agroecological approach, and found that in nearly every case there was an increase in yields, with an average of 79%[48]. This approach will strengthen the resilience of ecosystems to provide ecosystem services vital to food production, as well as increase the use of traditional and other farming practices that are resistant to climate change threats. Although the same general approach is proposed for the two different regions, the specific measures for each region will differ based on the unique characteristics and the climate threats to be addressed in each region. Measures within this approach that will be prioritized and used for each region are outlined below in the section on Project/Programme Objectives. In this manner, climate change adaptation measures to be introduced by the project will provide a support system to aid in agricultural production and help sustain the livelihoods of small holders and indigenous peoples.

In the productive landscape of Paraguay, there is a mix of different producers (*campesino* and other small producers, medium and large producers) and indigenous communities encompassing a variety of food production systems. The project will emphasize its actions on family agriculture producers and indigenous communities due to their greater vulnerability. Nevertheless, certain actions will be directed to other categories (medium and large producers) that are also located in the selected areas, and are relevant to the scheme of adaptation measures; thereby ensuring a holistic and inclusive approach of the project intervention.

The project will be piloted in two areas, one in the Eastern Region and the other in the Chaco, both of which are described below.

Intervention Sites

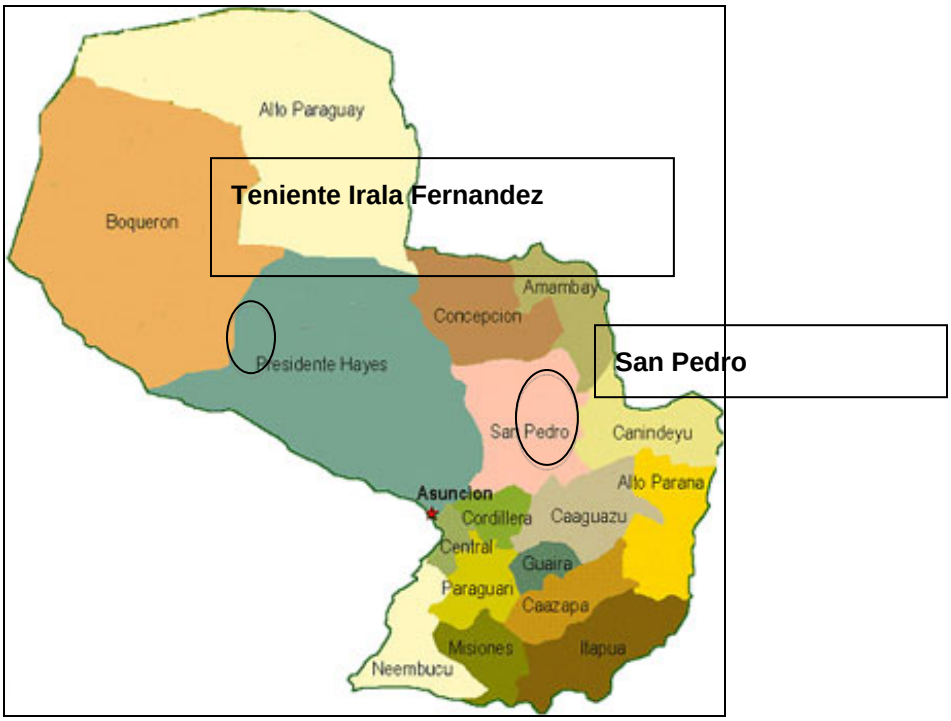
Two intervention sites have been selected on the basis of the following criteria: (i) climate vulnerability (exposure and sensitivity to climate change); (ii) social vulnerability of family producers and indigenous peoples (low adaptation capacity); (iii) availability of relevant information (production systems, agricultural practices, existence of ongoing programs and projects); (iv) diversity of production systems and target groups (combination of family agriculture and indigenous communities); (v) ecosystems with potential to provide services to agriculture.

The intervention site in the Chaco is Teniente Irala Fernandez in the Department of Presidente Hayes and the intervention site in the Eastern Region is the Department of San Pedro, both are indicated in the map below. The pilot sites, the specific

[48] Pretty, J. (2006). Agroecological Approaches to Agricultural Development. Rimisp-Latin American Centre for Rural Development.

communities and number of beneficiaries will be identified and described in the full-fledged proposal.

Map 5: Location of project intervention sites



- *Eastern Region*: San Pedro. San Pedro has a surface area of 20,002 km^2; 80% of the population lives in rural areas (approximately 250,000 people). San Pedro has the largest concentration of family producers in the country with 42,000 farms between 1 and 50 hectares that occupy a total surface area of 682,239 hectares. There are also 781 medium sized producers and 127 large landowners [49]. San Pedro has two distinct regions; the floodplains along the Paraguay River, which is composed of mainly lowlands and wetlands, and the higher areas to the East, which encompasses forest and agricultural lands, and where family agriculture takes place. The latter is part of the Upper Parana Atlantic Forest, an ecoregion rich in habitat diversity, which has been included in WWF´s Global 200 Ecoregions as a priority for conservation [50].

  The main crops cultivated by family producers are sesame (32,000 has), maize (35,000 has), and manioc (29,000 has). Other crops include cotton, soybean, sugar cane, wheat, peanuts, beans, pineapple, banana, tobacco, stevia, melons,

[49] Ministerio de Agricultura y Ganaderia. 2008. Censo Agropecuario Nacional
[50] WWF. WWF´s Global 200. http://www.worldwildlife.org/science/ecoregions/global200.html

watermelons, herbal mate, tomatoes, pumpkins, and peppers. Home gardens are common and farmers also raise small amounts of cattle mainly for dairy products. The majority of farmers use manual and animal traction and have adopted soil management practices and technical inputs in various degrees. These include for example, contour plowing, crop rotation, green fertilizers, minimum tillage, chemical pesticides and fertilizers, and hybrid seeds [51].

Farmer committees and cooperatives are the most common form of organization in the area. Farmer committees are made up by several families with common interests and resources that have the purpose of finding solutions to the problems they face in agricultural production.

The indigenous peoples in San Pedro comprise of 27 communities with 2,763 individuals [52], who are organized in the Association of Indigenous Communities of San Pedro. The economy of the indigenous communities is based on subsistence agriculture, hunting and fishing, gathering edible and medicinal plants in the woods, wage labor and selling of crafts. Traditional activities such as hunting and gathering have been reduced in the last decades due to deforestation and degradation of forests. Now indigenous communities are giving greater importance to other activities (agriculture, wage labor, crafts) to ensure food production and generate incomes[53].

- *Chaco:* Teniente Irala Fernandez. The area has a surface of 13,278 km^2. The area is located within the dry Chaco and is characterized by isolated streams, dry paleo-channels, and depressions where rainwater accumulates. There are few rivers and the average annual rainfall varies between 400 to 800 mm. The area is rich in biological and cultural diversity with indigenous peoples from several ethnic groups, small farmers and Mennonite colonies living and carrying out different types of economic activities. Indigenous peoples comprise of 15 communities with a total of 15,106 inhabitants occupying 111,957 hectares. There are also an estimated 3,200 small farmers occupying 60,000 hectares and 83 Mennonite villages occupying around 180,000 hectares[54,55].

Land use in the area comprises of livestock production, crop cultivation, private natural reserves, small sized reforestation, and ecotourism. Among the main activities are the production of milk and beef, and the cultivation of sesame, peanuts, sorghum, cotton, and sunflower. Current problems are related to low productivity of soils, overgrazing, an increase in pest and diseases in crops; lack of access to, and exchange of information

[51] Ministerio de Agricultura y Ganaderia. 2008. Censo Agropecuario Nacional

[52] Dirección General de Estadisticas, Encuestas y Censos. 2002. II Censo Nacional Indigena de Poblacion y Vivienda

[53] Ministerio de Agricultura y Ganaderia. Banco Mundial. Proyecto Manejo de Recursos Naturales y Reduccion de la Pobreza. Estrategia para los Pueblos Indigenas Ajustado.
http://www.mag.gov.py/estrategiandigena2%20BM%20NOV9[1].pdf

[54] The Mennonite villages in the district belong mostly to the “Menno” colony, one of the three colonies in the Chaco, which spans throughout the districts of Loma Plata and Irala Fernandez, and has a total of nearly 9,000 inhabitants. The majority live in the district of Irala Fernandez, although the exact number is unknown. The estimated surface area is based on the fact that usually each village comprises some 20-25 households with an average land size of 100 hectares.

[55] Municipalidad de Tte. Irala Fernandez. Cuestionario Ambiental Basico. Plan de Ordenamiento Territorial del Municipio de Tte. Irala Fernandez. 2011.

and knowledge on best practices and traditional knowledge on sustainable use and management.

Small farmers are engaged mainly in subsistence agriculture and small-scale livestock production. Men may also perform seasonal work outside their plots especially in the large cattle ranches. Women usually stay at home to tend home gardens and carry out other household chores and to raise the children. Indigenous communities are engaged mainly in small plots of family agriculture, mostly for self-consumption, and sometimes they sell or exchange any agricultural surplus locally. They also engage in collecting honey from the woods, as well as other products (medicinal and edible plants, raw materials for crafts, hunting of animals for food) depending on the state of their forests and at times they perform seasonal work. Mennonite farmers are engaged mainly in the production of beef and dairy cattle, and commercial agriculture, which is highly mechanized, with some 12,000 hectares of cotton, sesame, safflower, sorghum and peanuts; they usually have home gardens with food products.

PROJECT / PROGRAMME OBJECTIVES:

Paraguay is highly vulnerable to climate change, not only in terms of exposure and severity, but also due to the lack of adaptive capacity that is limited by several barriers. These barriers can be summarized as: i) information and knowledge gaps to address the adverse effects of climate change on rural populations, indigenous communities and other traditional communities, productive systems and ecosystems, ii) technical, operational and financial barriers to implement on-the-ground adaptation measures to ensure sustainable agricultural production and the resiliency of ecosystems and their services, and iii) institutional barriers to adequately address climate change adaptation issues.

The project goal is to reduce the vulnerability of the rural population (family agriculture producers) and indigenous communities of the Eastern and Chaco Regions of Paraguay to the impacts of climate change on their food production systems. This will be achieved through an agro-ecosystem approach that strengthens the resiliency of ecosystems to provide key ecosystem services to the production systems. In the project areas, these ecosystem services include, freshwater provision and regulation, protection against extreme weather events, flood regulation, climate regulation, prevention of the spread of alien species, nutrient cycling, and soil formation.

Measures within this approach that will be prioritized and used for each region include the conservation and restoration of “protective forests”[56] in watersheds that provide water for agriculture production; sustainable ranching practices that minimize deforestation; increase of the use of traditional farming practices such as rotation, combination of different crops, agroforestry, and diversification of crops that are resilient to a changing climate; and piloting agricultural insurance, incentives and microcredit for

[56] The 1973 Forest Law establishes that a minimum strip of 100 meters of forest must be left to each side of rivers, streams and around other water bodies for protection purposes. However, in many areas of the Eastern Region this has not been enforced and protective forests have been cleared for agriculture and pastures. In 2010 the Law for Forest Restoration in the Eastern Region and Forest Conservation in the Chaco was passed with the objective of promoting the restoration of protective forests.

small and medium scale farmers to undertake related activities In this way, the project aims to reduce the impacts from climate change that are currently being experienced by the target population, and are anticipated to increase greatly in the future.

The project will achieve this through the following three components:

1. Knowledge management on vulnerability and climate change resiliency improved with tools and instruments to implement cost-effective adaptation measures;
2. Adaptive capacity in rural areas of greatest vulnerability strengthened through concrete agro-ecosystem based adaptation measures; and
3. Capacity development and awareness to upscale effective implementation of adaptation measures at the national and local levels.

The project is in line with the four pillars of the National Climate Change Policy, namely:

1. *Strengthening of institutional capacities*. The objective of this pillar is to strengthen the institutional capacities to prove an adequate response to climate change issues, to foster partnerships that include the private sector and civil society, and to strengthen the legal and regulatory framework for an adequate implementation of the policy.
2. *Financing:* The objective of this pillar is to mobilize financial resources to confront the impacts of climate change.
3. *Education, communication and participation:* The objective of this pillar is to improve understanding and mainstreaming of climate change issues at national level.
4. *Management of knowledge and technology:* The objective of this pillar is to develop and mainstream knowledge management and scientific and technical instruments for adaptation and mitigation of the impacts of climate change.

In this sense, the project will spearhead the development of instruments and measures to adapt to climate change, and will pilot their implementation in the productive landscape in selected rural areas of the country with the purpose of generating experiences and lessons learned that will enable further replication on a more systematic basis throughout the country. At the same time, the project will strengthen the capacity of relevant stakeholders to help create an enabling environment for effective implementation of climate change adaptation in Paraguay.

The project will thus contribute to the National Climate Change Policy´s objective of mainstreaming climate change issues at the national level and promoting the implementation of coordinated measures that aim at developing an adequate approach that is in accordance with the national development priorities, the international commitments and the sustainable development.

Lessons Learned

Past projects in rural development and natural resource management have allowed the identification of lessons learned that have been taken into account during the design of this project, among the main ones are the following:

i) The micro-catchment is a particularly appropriate physical unit for land use planning, since it reflects all the problems occurring on a larger scale with natural resources and economic and social systems[57].

ii) Projects aimed at improving sustainable natural resource management, rural poverty alleviation and income generation in poor communities should: (a) include an effective and transparent process of participatory planning and decision-making; (b) be demand-oriented; and (c) combine actions in natural resources management, agricultural production and social needs of the communities in an integrated way[58].

ii) When planning conservation activities within the productive landscape it is important to consider conservation priorities and the needs of the community. Projects should take into account that: (a) priority is given to recognizing the expertise and views of small farmers, giving them ownership, and ensuring their participation; (b) there is involvement of farmers' organizations and NGOs throughout the project cycle in order to ensure quality of activities, avoid problems such as, and create networks; and (c) there is adequate monitoring and evaluation of results in order to scale up successful pilot experiences and measure the full impact of activities, and (d) the integration of women and family members in the implementation of activities contributes to better adoption of the production/conservation practices and measures[59] [60] [61].

ii) Technical agencies must provide strong support to the beneficiary groups in the area of planning, implementation, monitoring, and management for successful project implementation. Technical assistance should be provided on a continuous basis and without interruption throughout the calendar year and for a prudent time period (3-4 years) to ensure sustainability. Strengthening of beneficiary organizations involving local governments and organized civil society groups are key aspects to be taken into account [62] [63].

iv) Working with and strengthening indigenous organizations is important, respecting their culture and decision making processes to ensure active participation of organizations and communities in project implementation; adapting the project to the needs and demands that arise from communities without imposing pre-established packages, timing or modalities of work that are foreign to the communities [64].

v) The adoption of sustainable agricultural, forest and conservation practices by producers leads to an increase in diversification and productivity of the farms, and together with the strengthening of their organizations enable them to participate in productive and commercialization chains, hence receiving better prices for their

[57] World Bank
[58] World Bank
[59] WWF. Education for Nature Program News. Holtz, S. Restoration of the Upper Parana Region of the Atlantic Forest.
[60] World Bank. PRODERS
[61] GiZ. Manejo Forestal y Agricultura de Conservación: Experiencia de pequeños productores en la Región Oriental de Paraguay. MAG-GiZ-KFW. 2011
[62] World Bank. PRODERS
[63] GiZ. Manejo Forestal y Agricultura de Conservación: Experiencia de pequeños productores en la Región Oriental de Paraguay. MAG-GiZ-KFW. 2011
[64] World Bank. PRODERS

products and increasing their incomes [65].

The project design mainstreams these lessons learned by taking into account the use of participatory approaches; building on existing organizations (producers´ and indigenous peoples´ organizations, national and local level institutions); using a problem and demand driven approach; and creating win-win situations by combining environmental protection with agricultural production. All of these aspects are integrated within the project´s agro-ecosystem approach.

The 2nd National Communication identifies and prioritizes a number of needs as critical to facilitate climate change adaptation that the project also takes into account, including:

- Promotion of stakeholder participation and especially affected communities, giving value to their traditional knowledge to ensure these are mainstreamed into policies and programs,
- Promotion of research and assessment of climate-smart technologies and solutions applicable to CCA by producers, especially those that will contribute to guarantee food sovereignty and security, including crop diversification, research on varieties or species adapted to the future climatic conditions maintaining or increasing yields without significant increases in production costs, transfer of know-how and technology to family agriculture as a government priority,
- Restoration of degraded ecosystems that are vulnerable to climate change, ensuring a sustained flow of ecosystem services for agricultural production,
- Ensuring water supply in critical areas and taking measures against salinization of soils in the Chaco,
- Carry out further studies on CCA adaptation needs, and
- Awareness and outreach at all levels.

[65] GiZ. Manejo Forestal y Agricultura de Conservación: Experiencia de pequeños productores en la Región Oriental de Paraguay. MAG-GiZ-KFW. 2011

PROJECT / PROGRAMME COMPONENTS AND FINANCING:

PROJECT COMPONENTS	EXPECTED CONCRETE OUTPUTS	EXPECTED OUTCOMES	AMOUNT (US$)
1. Knowledge management on vulnerability and resilience to climate change improved with tools and instruments to implement cost-effective adaptation measures	1.1 Vulnerability studies and threat analyses on productive systems, ecosystems and populations in pilot areas to define strategies for ecosystem and community-based adaptation. 1.2 Information and monitoring system for agro-climatic risk assessment and mapping of agro-ecological zones on the basis of climatic and agronomic variables for crop suitability. 1.3 Technical standards for protection of forests and appropriate restoration practices. Maps of water resources, forests and other ecosystems in pilot areas to enable ecosystem based adaptation and the prioritization of restoration areas and practices that will ensure provision of vital services to food production 1.4 Research on selected priority crop varieties adapted to climate variability. Preservation, systematization and dissemination of knowledge on native and traditional species adapted to climate variability 1.5 Feasibility studies to develop supplementary instruments to strengthen adaptive capacity, such as, agricultural insurance for small producers, micro-credits for small and medium scale investments for adaptation at the farm level and incentives for small, medium and large producers.	Scientific and technical capacity of government agencies, and key stakeholders (local governments, academia, NGOs) enhanced with instruments to better understand and implement climate change adaptation at national and local levels	1,000,000

2. Adaptive capacity in rural areas of greatest vulnerability strengthened through concrete ecosystem services/agro-ecosystem-based adaptation measures	2.1 Conservation and restoration of forests and other ecosystems to protect or strengthen the vital services that they provide to the livelihoods of rural and indigenous communities. 2.2 Community-based adaptation plans for communities in pilot areas that contain concrete actions for adaptation that strengthen ecosystem resiliency, as well as draw on climate-resilient traditional and other natural practices, including • Conservation and restoration of "Protective Forests" • Adapted crop varieties with a focus on traditional species resilient to anticipated climate impacts, • Selection of seeds and development of local community seed banks, with a focus on traditional varieties that are well suited to the impacts of climate change, • Traditional farming practices such as multiple cropping and agro-forestry systems • Silvopastoral management that reduces deforestation and favors environmentally-friendly livestock production • Agro-ecological production that focuses on minimum external inputs e.g. integrated pest management, increased use of organic pesticides, increased use of natural fertilizers 2.3 Exchange of traditional and other knowledge among stakeholders, training and awareness building in project intervention areas to implement key adaptation strategies. 2.4 Support piloting of agriculture insurance, microcredit and incentive programs.	Rural communities increase their knowledge and means to respond to climate change risks and adapt their agricultural production systems Indigenous communities are able to adapt their food production systems, while respecting their ethnic-cultural and traditional knowledge	4,480,000

3. Capacity development and awareness to implement and upscale effective implementation of adaptation measures at national and local levels.	3.1 Training plan for SEAM, policy-makers and key stakeholders at national and local levels (departmental and municipal governments, universities, others) to raise awareness and build skills on climate change adaptation. 3.2 Training plan for partner agencies (MAG, INFONA, NGOs, universities, others) involved in project implementation to strengthen collaboration and enable them to implement adaptation measures in the field. 3.3 Mainstreaming of experiences and lessons learned into key ongoing field programs and projects at the national level.	Stakeholders enabled to effectively respond to long-term climate change impacts	520,000
6. Project/Programme Execution cost			570,000
7. Total Project/Programme Cost			6,570,000
8. Project Cycle Management Fee charged by the Implementing Entity (if applicable)			558,450
Amount of Financing Requested			7,128,450

PROJECTED CALENDAR:

MILESTONES	EXPECTED DATES
Start of Project/Programme Implementation	August 2012
Mid-term Review (if planned)	September 2014
Project/Programme Closing	December 2016
Terminal Evaluation	January 2017

PART II: PROJECT / PROGRAMME JUSTIFICATION

1. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

The goal of this 5-year project is to reduce the vulnerability of the rural population (family agriculture producers) and indigenous communities of the Eastern and Chaco Regions of Paraguay, to the impacts of climate change on their food production systems.

The project will be piloted in two sites, one in the Department of San Pedro of the Eastern Region and the other in the district of Teniente Irala Fernandez in the Department of Presidente Hayes in the Chaco. In the productive landscape of Paraguay in general, there is a mix of different rural producers´ (*campesino* and other small producers and medium and large producers) and indigenous communities encompassing a variety of food production systems. The project will focus its actions on family agriculture and indigenous communities due to their greater vulnerability.

Nevertheless, certain actions will also be directed to themedium and large producers that are located in the selected study areas, and are relevant to the adaptation measures; thereby ensuring a holistic and inclusive approach of the project intervention.

The project will address specific climate threats in each of the country´s two regions, namely, variations in temperature and rainfall patterns in the Eastern Region, and the increase in frequency and severity of drought events in the Chaco (see Table 6 above). The project will adopt an agro-ecosystem approach to reduce the vulnerability of food production systems in the Eastern and Chaco regions of Paraguay. The various components of the project will reduce the direct impacts of climate change on food production, strengthen ecosystem and community resilience to cope with climate change threats, and reduce economic and social losses at local level.

The project will implement the following three components:

Component 1: Knowledge management on vulnerability and resilience to climate change improved with tools and instruments to implement cost-effective adaptation measures

This component will seek to remove barriers related to existing gaps in information and knowledge regarding climate change adaptation. The project will generate information and develop instruments to enhance the capacity of government agencies to better understand the requirements for adaptation to climate change and hence implement concrete actions in the field to help communities adapt. The tools and instruments to be generated under this component will aim to support the piloting of specific “on-the-ground” climate change adaptation measures in the selected demonstration sites. To implement the component, SEAM will work in collaboration with the following government agencies: MAG/Risk Management Unit (UGR), INFONA, IPTA, AFD, MF, Meteorology Directorate, SEN, the private sector (insurance companies, micro-credit financial institutions, cooperatives, producers´ associations) and NGOs.

The project will carry out vulnerability studies and threats analyses on productive systems, ecosystems and populations in pilot areas in order to define strategies for ecosystem and community-based adaptation. These analyses will support the design of instruments under this component as well as the design and implementation of the pilot demonstrations under Component 2. The project will coordinate this activity with the UNEP Project “Mainstreaming of climate change adaptation measures into the national development processes in Latin America and the Caribbean – REGATTA”, which will carry out vulnerability and impact assessments in the Gran Chaco. The results of the REGATTA project will contribute to the vulnerability and impact assessments to be carried out by the proposed project in this region.

An information and monitoring system for assessing agro-climatic risks will be developed with the MAG/UGR to identify and map climatic risks at a detailed and operational scale at the pilot sites and at the individual properties within the sites. The system will be based on historical records (temperature, rainfall, crop yields, etc.), remote sensing and agro-models, and will be integrated with GIS to enable the assessment of risks in agricultural production that are associated to climate variability

and the technological level of production. The system will allow the identification of agro-climatic zones and production of maps of crop suitability, the quantification of historical variability of yields and economic data, the calculation of the probability of the occurrence of different levels of deviations in yields, the capacity of different production technologies, as well as monitoring climatic and agronomic variables (e.g. extreme temperatures and rainfall, hail, soil hydric balance, vegetation status). The system will inform the design of a set of concrete adaptation measures to be implemented in the pilot sites that are based on a risk management approach, which is currently lacking in the agricultural sector.

Another activity of the project will be the development of a set of technical standards for forest protection and restoration, which currently do not exist in the country. These standards will aim at restoring and ensuring the provision of vital ecosystem services to food production, such as water provision, nutrient cycling, soil formation, prevention of invasive species and the protection against extreme weather events. This activity will be carried out with the INFONA and relevant stakeholders. These standards will include technical criteria for conservation and restoration including, among others, the width of forest protection strips in relation to the width of water bodies, identification of the different ecosystems, species to be used in restoration and the specific measures for conservation of protective forests. The restoration and conservation practices developed under this activity will be established in guidelines and manuals taking into account cultural diversity and the targeted groups. On the basis of the developed standards, maps that overlap water resources (rivers, streams) with forests in the pilot sites will be prepared to identify possible areas for conservation and restoration.

The project will also seek collaboration with the IPTA, universities, NGOs, and the private sector, to expand research on crops and varieties resilient to climate variability, methods to control invasive species, and other issues that are of priority to family agriculture and indigenous peoples, as well as sustainable agricultural and natural resources management practices.

The project will also seek to develop supplementary instruments to strengthen adaptive capacity through feasibility studies on agricultural insurance for family agriculture, micro-credit for small and medium sized scale investments for adaptation at the farm level, and incentives for small, medium and large-scale agriculture. These studies will propose activities to be piloted in the project intervention areas, which will aim at facilitating access to economic resources for adaptation and insuring crops to secure incomes in the event of losses due to climatic variability.

For example, the project will study the feasibility of implementing agricultural insurance schemes for family agriculture that have great potential to allow farmers to recover from their losses and stabilize their income. The study will serve to identify information needed to quantify the risks associated with different agro-climatic variables, identify the products and tools necessary to monitor the evolution of the variables during the crop cycles, identify criteria to assess the feasibility of establishing insurance schemes based on climatic indices for small producers, and explore insurance schemes based on the indices that are best suited to the different types of production by family agriculture. The project will involve the MAG/UGR and the private sector in the development of the study

and will seek to leverage additional private sector funding to pilot the insurance schemes for family agriculture.

The project will carry out a feasibility study to assess the potential of micro-credit for small and medium sized scale investments for adaptation at the farm level that could foster the resiliency of ecosystems upon which they depend in order to secure and maintain their income streams. The project will study the viability of attracting and channeling public and private funding and developing and piloting new financial products to provide capital for rural populations to adjust their existing activities or create new ones that draw on ecosystem based approaches to adapt to climate change.

The project will also study the feasibility of establishing incentives for medium and large-scale producers to invest in adaptation measures that enhance the resiliency of ecosystems. This activity will assess existing regulations, such as the Forest Law, the Afforestation/Reforestation Law, the Environmental Services Law, the Fiscal Reorganization Law, the Law for Forest Restoration in the Eastern Region and Forest Conservation in the Chaco) some of which include different kinds of incentives (e.g. fiscal incentives for afforestation/reforestation, payment for environmental services, grants for management of native forests), and will build upon them to propose innovative incentives to strengthen climate change adaptation based on an ecosystem approach.

The results from these feasibility analyses will guide the selection of the financial mechanisms to be piloted under Component 2, and therefore it is possible that not all of them will be implemented.

The proposed activities and studies will make use of a landscape-scale approach taking into account that the intervention sites are in fact made up of a mosaic of natural areas, agricultural areas and communities. The studies to be undertaken will take into account the conditions and trends of natural resource use, natural and anthropogenic influences and the opportunities for conservation, restoration and development. The approach will also consider the value of ecosystem services to ensure sustainable livelihoods and development needs in the context of a changing climate.

Component 2: Adaptive capacity in rural areas of greatest vulnerability strengthened through concrete ecosystem services/agro-ecosystem based adaptation measures

This component focuses on the implementation of concrete adaptation actions that will increase adaptive capacity and ecosystem resiliency in targeted project areas within an ecosystem/agro-ecosystem approach. With the support of the studies and instruments to be developed under Component 1, the project will design and pilot the implementation of a set of targeted ecosystem-based activities (agricultural, forest, water management) to address climate change adaptation by the target groups in the selected sites, with a priority on family agriculture producers (*campesino* farmers, and other small farmers) and indigenous communities. To this effect, the project´s approach will recognize the importance of ecosystems and agricultural systems in support of food production by the most vulnerable social groups, and will take into account the importance of ecosystem resilience, socio-environmental planning, traditional knowledge and gender equality. Agro-ecosystems have been shown to increase crop

yields and reduce vulnerability in food production. For instance, in Kenya, villages that implemented double-dug beds improved domestic food supply for several tens of thousands of households by producing a year round supply of vegetables. Similarly, in communities in China, the widespread adoption of rice aquaculture systems had the dual benefit of increase rice yields and fish production[66].

Through this component, the project will contribute to removing existing technical, operational and financial barriers to implement on-the-ground adaptation measures to reduce the vulnerability of family agriculture producers and indigenous communities to the adverse effects of climate change. Currently, there are a number of programs and projects providing assistance to these groups. However, there is a lack of information, technical support and tools needed in order to engage in activities that specifically address climate change adaptation in the field. This situation hinders mainstreaming of adaptation into those interventions, as well as an adequate transfer of know-how and technology to vulnerable groups and the realization of investments. This is in turn reflected in a lack of resources channeled toward climate change adaptation by the public and private sectors. There is also a lack of awareness on climate change issues by producers (small, medium and large), indigenous peoples.

The instruments developed under Component 1, namely, the agro-climatic information and monitoring tool and the agro-ecological maps, the forest-water resources maps the identification of the possible areas for conservation and restoration, research priorities and protocols, and feasibility studies on agricultural insurance, micro-credit and incentives will be used to develop community adaptation plans that include concrete adaptation measures.

The adaptation plans and concrete measures will be designed through a participatory process with relevant stakeholders in the selected sites (e.g small holders, indigenous communities, departmental and municipal governments, local associations and grassroots organizations). Key government agencies to be involved in the design and implementation, include MAG/UGR and MAG/Agrarian Extension Directorate (DEAG), INFONA, IPTA, SENAVE, SEN, Itaipú/Yacyretá bi-national entities, universities, departmental and municipal government, as well as the private sector (insurance companies, MFIs, etc) and NGOs.

Concrete actions for adaptation will focus on ecosystem resiliency, climate-resilient traditional practices and other environmentally friendly practices. These may include activities and practices such as the ones included in Table 7 below:

Table 7: Proposed Adaptation Activities

Proposed Adaptation Activities
Conservation and restoration of forests and other ecosystems to protect or strengthen the vital services that they provide to the livelihoods of rural and indigenous

[66] Pretty, J. (2006). Agroecological Approaches to Agricultural Development. Rimisp-Latin American Centre for Rural Development.

communities. • Reforestation with native species • Enrichment with species e.g. yerba mate, palm trees, fruit trees, others • Windbreaks / Firebreaks • Natural regeneration • Forest management • Use of flora • Use of non-timber products
Community-based adaptation plans for communities in pilot areas that contain concrete actions for adaptation that strengthen ecosystem resiliency, as well as draw on climate-resilient traditional and other natural practices, including: • Crops adapted to climate variability with an emphasis on traditional resilient varieties • Crop diversification and staggered planting to reduce risks of losses • Agro-forestry systems / Silvopastoral management • Selection of seeds and establishment of community seed banks • Green fertilizers • Soil conservation and management techniques – crop associations and rotation, minimum/zero tillage, soil coverage • Integrated pest management / Organic pesticides / natural fertilizers • Post-harvest storage (grain silos) • Water storage and irrigation systems adapted to subsistence and family agriculture
• Exchange of traditional and other knowledge among stakeholders, training and awareness building in project intervention areas to implement key adaptation strategies.
• Piloting of agriculture insurance, microcredit and incentive programs.

The proposed adaptation measures to be designed and implemented will be based on the specific climate threats to be addressed in each intervention site. Table 8 below indicates how the proposed activities will help address the identified climate threats.

Table 8: Proposed Activities and Climate Threats

Activity	**CLIMATE THREATS ADDRESSED**				**Anticipated impact time**
	Increase in temperature	**Increase of droughts**	**Intense rainfall in short periods**	**Wildfires**	
Restoration • Reforestation • Enrichment • Windbreaks / Firebreaks • Natural regeneration	Enhanced tree cover reduces temperatures and evapotranspiration	Enhanced tree cover retains soil moisture and protects from wind erosion	Enhanced tree cover provides protection	N/A	Medium-long term
Forest conservation, sustainable use and management	Tree cover reduces temperatures and evapotranspiration	Tree cover retains soil moisture and protects from wind erosion	Tree cover provides protection	Natural barriers	Short-long term
Crop varieties	Increased	Increased tolerance	N/A	Increased use	Short-long

Activity	CLIMATE THREATS ADDRESSED				Anticipated impact time
	Increase in temperature	Increase of droughts	Intense rainfall in short periods	Wildfires	
adapted to climate variability / Seed selection	tolerance to high temperatures	to droughts		of crops with less risk to fire	term
Soil conservation and management • Minimum/ zero tillage • Green fertilizers / compost • Crop rotation / association • Firebreaks	Soil coverage reduces evapotranspiration and maintains adequate soil temperature for crop development	Soil coverage reduces evapotranspiration, retains soil moisture and protects from wind erosion	Protection from erosion	Protection against fires (firebreaks)	Short-medium term
Agroforestry / Silvopastoral management	Tree cover reduces temperatures and evapotranspiration	Tree cover retains soil moisture, reduces evapotranspiration and protects from wind erosion.	Tree cover protects from direct impact on crops / pastures, and erosion	N/A	Med-long term
Integrated pest management / organic pesticides	Control of pests/diseases that may arise as a result of climate change	Control of pests/diseases that may arise as a result of climate change	Control of pests/diseases that may arise as a result of climate change	N/A	Short term
Crop diversification and staggered planting	Production secured throughout the year decreasing the risk of losses	Production secured throughout the year decreasing the risk of losses	Production secured throughout the year decreasing the risk of losses	Production secured throughout the year decreasing the risk of losses	Short term
Post-harvest storage	Less risk of post-harvest losses due to lack of, or precarious storage	Products available during drought events	Less risk of post-harvest losses due to lack of, or precarious storage	Less risk of post-harvest losses due to lack of, or precarious storage	Short term
Water storage and irrigation systems	N/A	Production secured during drought events	N/A	N/A	Medium term
Agricultural insurance	Monetary compensation for losses	Monetary compensation for losses	Monetary compensation for losses	Monetary compensation for losses	Medium-long term
Micro-credit	Increased adoption of adaptation measures	Increased adoption of adaptation measures	Increased adoption of adaptation measures	Increased adoption of adaptation measures	Medium-long term
Fiscal incentives	Increased adoption of adaptation measures	Increased adoption of adaptation measures	Increased adoption of adaptation measures	Increased adoption of adaptation measures	Medium-long term

The project foresees a combination of practices that will provide benefits in the short, medium and long term for restoring and maintaining ecosystem services, climate-proofing agricultural practices and maintaining or enhancing crop yields. For example,

practices aimed at soil recovery and management (soil coverage, minimum tillage, etc.), crop rotation and the use of green fertilizers, provide benefits in the short term by restoring soil fertility and preventing erosion and at the same time increasing crop yields. The combination of crops, pastures and trees in agroforestry and silvopastoral systems, and the enrichment of forests with species such as herbal mate, medicinal species, palm and fruit trees, and the use of crops adapted to climate variability provide both environmental and economic benefits in the short, medium and long terms. These systems with varying production cycles will also enable the provision of food throughout the year. “The potential for increasing food production while maintaining water-related ecosystem services restson capacity to increase water productivity (WP), i.e. by realizing more kg of food per unit of water. Sustainable agricultural practices may do this by: i) removing limitations on productivity by enhancing soil fertility; ii) reducing soil evaporation through conservation tillage; iii) using more water efficient varieties; iv) reducing water losses to unrecoverable sinks; v) boosting productivity by supplemental irrigation in rainfed systems” (Pretty, 2006, pg 19). Practices such as forest restoration and natural regeneration will provide benefits in the long term, especially by restoring the supply of ecosystem services thereby enhancing ecosystem resilience.

A number of the proposed practices are related to climate-proofing, including: staggered planting of diversified crops reduce climate risks by ensuring availability of staple and cash crops throughout the year; selection of seeds and the establishment of seed banks ensure the distribution of adapted varieties; windbreaks protect crops from strong winds; minimum/zero tillage increases water infiltration and maintains soil humidity during dry periods; trees in agroforestry systems provide protection to crops from excess temperatures, winds, and storms; rainwater storage in farm reservoirs and irrigation systems ensures the provision of water during dry periods; and grain silos at the farm and/or community level provide protection from climatic events while at the same time ensure availability of products throughout the year either for consumption or commercialization. In regards to drought and the implementation of water retention infrastructure, the project will implement “small” retention infrastructure such as water storage and irrigation systems adapted to subsistence and family agriculture, this will help farmers in the short-term. In the medium to large term water retention benefits will be realized through several of the other project activities, such as restoration of forests and soil management practices.

The combination of a number of these practices will reduce the vulnerability of the target groups to climate change. It should also be noted that a number of these activities may be implemented upstream from the targeted groups, nonetheless the benefits will be experienced downstream, and even beyond the project intervention sites. For instance, restoration upstream enhances water retention and nutrient cycling and therefore increase water quantity and quality and soil fertility downstream resulting in increased agricultural productivity. An increase in agriculture productivity will provide communities with food and revenue and reduce the pressure on surrounding forests, making the forests and the services they provide more resilient to climate change. The benefits of this landscape management to enhance ecosystem services will extend even further downstream to communities, beyond the intervention sites. Table 9 below establishes the links between the proposed activities under the agro-ecosystem approach and ecosystem services to be maintained, restored and/or enhanced.

Table 9: Proposed Activities and their Relation to Ecosystem Services and Benefits Derived

Activity	Ecosystem Services	Benefit to Agricultural System	Additional benefits (social, culture, economic)
Restoration	• Increased levels of nutrient cycling, soil formation and fertility • Improved climate regulation • Pest and disease regulation • Increased water quantity and quality • Provisioning services: food, freshwater, wood, fiber, fuel • Aesthetic and cultural services • Biodiversity conserved by increased forest connectivity • Carbon storage	• Protection from extreme weather events (medium-long term) • Increased availability of water for irrigation (medium-long term) • Less pests and diseases (medium-long term) • Reduced erosion (medium-long term) • Crop pollination secured (medium-long term)	• Timber products (fuelwood, wood for housing or selling) (medium-long term) • Non-timber products (edible and medicinal plants, raw material for crafts) (medium-long term) • Freshwater for human and animal consumption (medium-long term) • Traditional activities by indigenous peoples hunting-cultural/religious activities) (medium-long term)
Forest conservation, sustainable use and management	• Increased nutrient cycling, soil formation and fertility • Improved climate regulation • Pest and disease regulation • Increased water quantity and quality • Provisioning services: food, freshwater, wood, fiber, fuel • Biodiversity conservation • Aesthetic and cultural services • Carbon storage	• Protection from extreme weather events (medium-long term) • Increased availability of water for irrigation (medium-long term) • Less pests and diseases (medium-long term) • Crop pollination secured (medium-long term) • Reduced erosion (medium-long term)	• Timber products (fuelwood, wood for housing or selling) (medium-long term) • Non-timber products (edible and medicinal plants, raw material for crafts) (medium-long term) • Provision of freshwater for human and animal consumption (medium-long term) • Protection of traditional activities by indigenous peoples hunting-cultural/religious activities) (medium-long term)
Soil conservation and management	• Increased levels of soil humidity, stability and fertility	• Prevention of erosion (short term) • Increased yields (short term) • Diversification of crops (medium term) • Greater availability of fodder for small farm animals (medium term)	• Enhanced income (medium) • Increased and diversified availability of food throughout the year (short-medium term) • Enhanced nutrition levels
Agroforestry / Silvopastoral	• Increased levels of soil humidity, stability and	• Increased crop yields (medium	• Enhanced income (medium)

Activity	Ecosystem Services	Benefit to Agricultural System	Additional benefits (social, culture, economic)
management	fertility • Climate regulation • Pest and disease regulation • Provisioning services: food, wood, fuel • Biodiversity conservation • Carbon storage	term) • Increased production of milk and weight gain of livestock (medium term) • Greater availability of fodder for small farm animals (medium term) • Diversification of products – annual and perennial (medium-long term) • Protection of crops and livestock from extreme weather events (short-long term) • Less pests and diseases affecting crops and pastures (med-long term) • Pollination of crops and trees secured (med-long term)	• Increased and diversified availability of food throughout the year (short-long term) • Timber products (fuelwood, wood) • Non-timber products (edible and medicinal plants) (medium-long term)

The proposed models to be promoted by the project are:

(i) Small/medium sized farmers: the key problems among small holders are the low productivity of soils due to the loss of fertility and erosion, combined with a low level of conservation practices and efficient agricultural practices, and environmental deterioration due to deforestation and degradation of forests. Project activities will address these underlying constraints that represent major barriers to adaptation. As such, the activities to be developed for this target group will focus on the forest conservation and restoration, soil conservation and management, and agro-ecological practices. The project will develop and pilot an agricultural insurance scheme and conduct a study on micro-credit schemes aimed at financing farm level adaptation related investments;

(ii) Large landowners: activities will be aimed at restoration of forests, including protective forests within the framework of the scheme known in Paraguay as “legal adequacy”. The forest law stipulates that a minimum of 25% of the forest area of any property where forests are cleared must be left as reserve (known as legal reserve), and that a 100 meter strip of forest is to be left at each side of any waterway for protection purposes (known as protective forests). However, before the passing of the zero deforestation law in the Eastern Region in 2004, many landowners did not comply with the forest law and cleared forests beyond the stipulated limits. The legal adequacy strategy comprises of three actions: awareness raising, enforcement of the forest law, and monitoring of compliance. There have been some successful experiences in raising awareness, but limited

examples of restoration/reforestation since the landholders had to cover the costs of restoration. The project will build upon previous experience and will develop and pilot the "legal adequacy" scheme incorporating a fiscal incentive as an additional action of the strategy aimed at facilitating landowners to incur the restoration costs;

(iii) Indigenous communities: activities with indigenous communities will comprise of sustainable forest management and use, restoration, agroforestry, and other agro-ecological practices directed toward subsistence agriculture.

Table 10: Activities to be implemented with the target groups

Small/medium farmers	Large scale farmers	Indigenous communities
• Reforestation with native species • Enrichment • Windbreaks / Firebreaks • Natural regeneration • Forest management • Use of flora • Use of non-timber products • Crops adapted to climate variability with an emphasis on traditional resilient varieties • Crop diversification and staggered planting to reduce risks of losses • Agro-forestry systems / Silvopastoral management • Selection of seeds and establishment of community seed banks • Green fertilizers • Soil conservation and management techniques • Integrated pest management / Organic pesticides / natural fertilizers • Post-harvest storage • Water storage and irrigation systems	• Reforestation with native species • Enrichment with native species • Natural regeneration	• Reforestation with native species • Enrichment • Windbreaks / Firebreaks • Natural regeneration • Forest management • Use of flora • Use of non-timber products • Crops adapted to climate variability with an emphasis on traditional resilient varieties • Crop diversification and staggered planting to reduce risks of losses • Agro-forestry systems / Silvopastoral management • Selection of seeds and establishment of community seed banks • Post-harvest storage • Water storage and irrigation systems

The project will produce manuals and guidelines based on these best practices and will develop a strategy for the exchange of traditional and other knowledge among stakeholders, training, and awareness building in project intervention areas to implement key adaptation strategies. The strategy will aid in building awareness of climate change threats, disseminating information and exchanging know-how and adaptive technology so that the target groups can adapt to specific climate change threats in each one of the regions.

The project will also pilot these activities to provide opportunities for learning by doing. In this sense, stakeholder participation will be critical. Stakeholders will be engaged in activities such as participatory analysis of local threats and vulnerabilities; participatory action research with small holders and indigenous communities to assess issues such as different adaptation strategies for addressing climate change, their perception on climate change and food production, assessing the most effective ways to foster adaptive responses to climate change; development of adaptation plans; risk management; on-farm trials of technologies to adapt their production systems to climate change, among others. The project will also monitor the socio-economic and ecological benefits of the adaptation measures implemented in the intervention sites with the participation of the target groups.

To this end, the project will provide advice and training to implementing partners, stakeholders and target groups in pilot areas and demonstrate best practice in order to develop new skills and a knowledge base. The pilot intervention strategies will be designed so as to strengthen local knowledge systems, organizations and institutions, thereby enhancing capacities for local innovation, and their up-take by more people and places. In this manner, the project will foster the establishment of sustainable management of natural resources and food production that mainstream climate change adaptation criteria and strategies.

Strengthening of community organizations will include stronger community involvement and information sharing through workshops on the issue of climate change and how this is, and will continue to pose a threat to their food production systems, as well as the specific factors that make them particularly vulnerable to climate change. Once the organization and its members are better aware of the scope and the threats posed from climate change, they will understand its importance and the urgency of adopting concrete actions. The next step will be to empower these organizations and its members by giving them active participation in the project´s planning and decision making process, which will include identifying adaption practice based on local traditional knowledge. The best ways to strengthen local organizations will be to make them active participants in the process of reducing their vulnerability by adopting adaptation measures and thus ensuring food production. Empowerment, plus solid and continuous support from the project will instill and promote ownership among the communities. Specific training and awareness raising aimed at the target groups and their organizations will comprise the agro-ecosystem approach and climate change emphasizing in:

i) Soil conservation and management (e.g. general information on soils, green fertilizers, soil conservation practices, crop diversification and rotation, minimum/zero tillage, windbreaks, etc.);

ii) Agroforestry and agrosilvopastoral systems (e.g. agro-ecological zones and possible combinations, establishment of nurseries, forestry practices, integrated pest management, organic pesticides, etc.);

iii) Climate change vulnerability, risks and adaptation (use of climatic information and response measures, adaptation measures, etc.), monitoring of socio-

economic and ecological benefits of the adaptation measures implemented in the intervention sites (surveys, collection of data, assessment of data).

Healthy ecosystems are essential for ensuring ecosystem services and long-term food security. The project approach and concrete actions will ensure a flow of ecosystem services vital for food production. Strengthened ecosystem services will ensure a more dependable flow of other services and resources (spill over effect) to the communities such as more availability of natural medicine sources, raw materials for shelter building, wild honey harvesting, fish resources, and timber and non-timber products. Moreover, healthy ecosystems may act as natural barriers to prevent the dissemination of disease outbreaks, to help counteract climate change, and to provide aesthetic and cultural values to many communities.

Component 3: Capacity development and awareness to implement and upscale effective implementation of adaptation measures at national and local levels.

This component will remove institutional barriers to adequately address climate change adaptation. There is a lack of awareness, knowledge and skills related to climate change, and more specifically adaptation, and how to undertake adaptation measures at all levels of government (central, departmental and municipal) and relevant stakeholders. The project will enhance stakeholder capacities enabling them to effectively respond to long-term climate change impacts.

The project will design training programs suited to different government stakeholders including SEAM staff, policy-makers and other key stakeholders such as the departmental and municipal governments, universities and others. The expected results of these training programs will be increased awareness, suitable skills, more informed decision-making, and improved academic research to generate knowledge to properly address the problems posed by climate change.

Likewise, the project will identify the specific training needs of the institutions (government, NGOs, private sector) that will develop and implement activities in the pilot sites within the scope of the project. On the basis of this assessment, the project will develop training programs to ensure that technical staff are adequately trained to implement the demonstration activities under Component 2, as well as developing and maintaining adequate working relations with the project target groups.

The following table includes a description of the training and awareness raising activities to be carried out with the different stakeholders and the skills to be developed.

Table 11. Capacity building activities and skills to be developed

Beneficiaries	**Activities**	**Skills to be developed**
SEAM		
		• Planning, technical and analytical skills

Beneficiaries	Activities	Skills to be developed
• Ministry of the Environment (SEAM)	• Targeted training	to assess climate change adaptation issues, develop proposals, mainstream adaptation in different SEAM initiatives/projects/regulations • Negotiating skills to promote consideration of adaptation issues by third parties (government, non-government, private sector) • Communication skills to implement awareness raising, and to develop information and training material and carry out training.
Departmental and Municipal Governments in intervention sites		
• Authorities from 2 Departments and 2 districts	• Awareness raising	• Local level decision-making that mainstreams climate change adaptation
• 2 Municipal Councils (between 10-20 council members)	• Awareness raising	• Local level decision-making that mainstreams climate change adaptation
• At least 3 staffs from 4 governments bodies (Planning, Environment and Indigenous Peoples Secretariats)	• Targeted training:	• Planning, technical and analytical skills to assess climate change adaptation issues at local level • Negotiating skills to promote consideration of adaptation issues by initiatives intervening in the area • Communication skills for awareness raising
Institutions participating in project activities		
• 100 central level and field technicians from MAG, SEN, SENAVE, IPTA, INDI, INDERT, INFONA, universities, NGOs)	• Targeted training	• Planning, technical and analytical skills to assess climate change adaptation issues at local level • Communication skills to interact with communities to identify, agree and implement adaptation measures • Research skills to promote increased research in support of project activities

The lessons learned from the pilot demonstration sites will be identified, systematized and mainstreamed into the training programs, so as to ensure continuous updating of the capacity building activities. Likewise, the project will coordinate with ongoing and planned field programs and projects in order to mainstream the experience and lessons learned into their work-plans, thereby expanding climate change adaptation measures to other areas of the country. Of special interest in these terms are SEAM´s environmental initiatives, the MAG´s National Programme to Support Family Agriculture (PRONAF), the National Food Production Programme (PPA) and the National

Programme for Indigenous Peoples´ Agriculture and Economy (PAEI), INFONA´s Strategic Plan, the WB funded Sustainable Rural Development Programme and the IFAD funded Rural Paraguay Project, the UNEP/GEF Chaco project and the WB/GEF biodiversity project. Mainstreaming of lessons learned into these plans/programs will ensure sustainability of project results and continued long-term support to the community adaptation plans to be prepared, thereby ensuring assistance to long-term activities such as restoration. Training and awareness raising of project beneficiaries, institutional personnel and authorities as foreseen under components 2 and 3 will be key to ensure mainstreaming of lessons learned and long-term sustainability of adaptation measures.

Project components 1 through 3 are interlinked and together aim at overcoming the barriers to successful implementation of CCA measures to reduce vulnerability and increase the resiliency of communities and ecosystems. The models and tools to be developed will fill the existing gaps in knowledge and technical skills for decision making that currently are insufficient or non-existent, opening the way for testing CCA measures, and mainstreaming the lessons to be learned.

Cross-cutting issues

Project design and implementation will encompass cross-cutting social, ethnical and cultural approaches in all its main criteria, objectives, components and sub-components. The purpose of this is to ensure a holistic approach in all project activities. The main cross-cutting approaches of this project are reflected from the ones in the National Climate Change Policy, which are: gender equality, cultural diversity and an approach to ensure fair and equal human rights.

The project will consider the ethnic-cultural background of each group - indigenous peoples, rural, semi-rural and urban groups - that may be impacted in any form by actions undertaken by this project. The consistent and equal application of human rights should be aligned to that of the Paraguayan Government and be reflected in the Declaration of Human Rights. The project will take into account cultural diversity, different societal constructions, demographics and gender equality issues in the application of adaptive actions to climate change. This includes initiatives on agriculture, restoration and preservation of forests and protective environments and others.

The development of sound, respectful and effective communication will be encouraged and maintained as an important human factor in the interaction with the different communities, individuals, and entities related to this project.

It is important to note that SEAM encourages a socio-environmental approach that takes into account the relationship between human populations and their social, economic and cultural activities with the surrounding ecosystems in which they live. Within this framework, and as advocated by SEAM, the following key aspects will be taken into account in this project:

- The participation of local stakeholders is critical, especially in the case of indigenous communities and in recognizing their human and cultural rights.

SEAM will ensure the active participation and a strong representation of indigenous groups throughout the implementation of this project.

- SEAM has a socio-environmental policy which is inclusive of all indigenous rights and other non-indigenous communities. The approach moves beyond strict environmental conservation and takes into consideration human rights and the intrinsic and delicate relationship that everyone has with the ecosystem in which they live in. In particular there is a strong relationship between indigenous peoples' culture and the environment. This approach is supported by a comprehensive set of laws that advocate and protect indigenous peoples. Further descriptions of these laws are in the annexed document.

- Many indigenous communities typically have their own governing structures based on traditional rights and a specific regulatory framework;

- Indigenous peoples´ organizations should be regularly informed about the project and all prior, and informed consent processes will occur.

- The role of women as active participants and their vital role in society will be taken into account according to the standard human rights, and also in consideration of each local indigenous cultural and ethnic background.

- The unique indigenous all-encompassing cosmo-vision, which is not always aligned with other views, should and needs to be respected.

The project activities that will be implemented within indigenous communities will take into account their rights and culture, and therefore activities may need to be adapted for each linguistic and ethnic context. Furthermore activities will be based on up-to-date information on the status of ecosystems, land uses and other aspects to allow adequate selection of activities to be implemented in the field. The most adequate methodologies and human resources for the project implementation will be identified.

In this context, SEAM has elaborated guidelines for implementing projects with indigenous communities, which are included in Annex 3 and will be taken into account by the AF project when designing, planning and carrying out its activities.

With this in mind, the project takes into account systematization, dissemination and use of traditional knowledge and practices as a key strategy to reduce the vulnerability of food production to a changing climate.

Traditional practices by both indigenous peoples and farmer communities include the use of local flora and fauna, food harvesting from native tress, collection of fruits and honey, natural medicines, raw materials for shelter building, aesthetic and spiritual values.

In addition to enhancing and protecting ecosystem services to provide indigenous and farming communities with the means to restore and increase the use of traditional practices, the project will seek to identify which of these practices are most suitable in terms of their resilience and adaptability to a changing climate according to ecosystem types and conditions, water availability, soils, etc. Traditional knowledge can also help identify types of soil that do not drain easily in drought prone areas, can be used to implement rainwater reservoirs for irrigation in a more natural, sustainable and cost efficient manner. Some communities carry out small-scale cultivation of medicinal and food gardens under trees that benefit from shade and protection from weather events and can be used as examples of good practices. A number of species have several traditional uses ranging from food, wood for shelter, fire, fiber, clothing, utensils, medicine, and spiritual practices (e.g. wild beans, cactus fruits, and several types of watermelons, wild pumpkins and potatoes, local varieties of maize, trees such as *algarrobo* and *karanday*, etc.). Traditional knowledge enables them to identify which types of fruits, roots and animals are available based on each season of the year, the maturation rate and weather conditions. Traditional knowledge also includes, recognizing the chirping, noises, movements and flight direction of birds to predict changes in weather condition. Traditional knowledge serves to determine when to harvest, according to the weather, which affects the maturation of crops or wild foods. The project will use effective and culturally adapted ways to effectively involve and empower farmers and indigenous communities towards using their traditional practices and adapting them to a changing climate with an approach to improve the health of their ecosystems and livelihoods and make the resiliency of their habitat.

The proposed activities of this project are strongly linked to women's role in society and within the family in terms of food production, since rural women are in charge of securing food for the family. In fact, women contribute to family agriculture by tending small home gardens, feeding of small farm animals and gathering edibles from the forests and other ecosystems. As such, women play a significant role for the successful adoption and implementation of adaptation practices.

Adaptation to climate change and food production will have a gender sensitive approach, taking into account women´s role in food production according to the different target groups (indigenous and non-indigenous). Experience shows that participation of women in natural resource management has resulted in an increased adoption of the practices promoted by the projects[67]. This project will therefore aim at fostering active participation by women in the identification, design and implementation of adaptation practices. This will include participation in: planning exercises, participatory research and field trials, exchange of information with project technicians, consultation and training workshops, field days and other activities.

For indigenous women, the approach towards gender and its importance in matters of adaptation practices will have to be adapted to each indigenous cultural group. In sum, gender considerations have to be carefully addressed and each adaptation measure will be suited for the proper inclusion of women and children, respecting each community's own ethnic identity and cultural background.

[67] GiZ. Manejo Forestal y Agricultura de Conservación: Experiencia de pequeños productores en la Región Oriental de Paraguay. MAG-GiZ-KFW. 2011

A number of institutions, programs and projects are involved in activities addressing agricultural research and production, food security, sustainable management of natural resources, and capacity building. Although most of the activities are not specifically adaptation-oriented, they constitute an important baseline on which the project can draw upon and build its activities. The following table includes a preliminary list of relevant stakeholders.

Table 12: Relevant stakeholders

Government
• Environment Secretariat (SEAM) • National Climate Change Commission • National Forest Institute (INFONA) • National Indigenous Peoples Institute (INDI) • National Rural Development and Lands (INDERT) • National Emergency Secretariat (SEN) • Ministry of Finance (MH) • Itaipu/Yacyreta Bi-national Entities • Meteorology Directorate • Universities • Paraguayan Institute of Agrarian Technology (IPTA) • National Plan Protection Service (SENAVE) • Financial Agency for Development (AFD) • Departmental Governments • Municipalities
NGOs and grassroots organizations
There are several NGO networks that could be relevant to the project: • POJOAJU – Paraguayan NGO Network • ROAM – Network of Environmental NGOs • RED RURAL – Rural Network of Private Development Organizations • Network of NGOs supporting Indigenous Peoples • ALIDES – Alliance of Leaders for Sustainable Development Farmers and indigenous communities are organized in a number of local and community associations. The project will identify the specific organizations once the sites and beneficiary communities have been selected.
Private sector
Small, medium and large producers are associated to cooperatives as well as associations that operate at local and/or national levels depending on the type of organization and scope of work. The project will identify the specific organizations once the specific sites and beneficiary communities have been selected. There are a number of micro-financial institutions (MFI) and insurance companies that operate in the country and the project may establish partnerships with these institutions to implement project activities.

2. Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities.

The project´s direct beneficiaries will be the rural population comprising family agriculture producers (*campesino* communities, and other small farmers), and indigenous communities considering their greater state of vulnerability to climate change. This project will generate a series of economic, social and environmental benefits to the communities by providing the overall means and promoting actions to address the several weaknesses of their food production systems and the degradation of the ecosystems and the services they provide. This includes the promotion of diversified and resilient crops, which have to be chosen for each particular type of soil, water availability, current and projected weather patterns, and the overall environmental conditions of each area and the conservation and restoration of forests, among others.

With enhanced food production systems, the target groups will also have more suitable economic conditions for trading and selling their goods. This will be achieved with an increase in the local capacity to cope with climate change, hence reducing vulnerability of production, and increasing food availability by having diversified staples produced. That, in turn will help obtain increased yields and income, plus ensure reliable system of food production for self-consumption, which will make communities less vulnerable to economic shortcomings and market fluctuations.

The project's benefits on the environment are clear, and these benefits have a strong relationship in improving the ecosystem services to the targeted communities and also the adaptation actions will enhance the overall economic and social situation in two ways; by increased yields, which translates into greater availability of food for self-consumption throughout the year and commercialization, and in some cases by means of better prices for crops. Economical and social benefits will be derived from the set of proposed practices, which aim at improving key ecosystem services (e.g. improved soils, water quality and quantity, etc.).

Recent case studies and impact surveys carried out by the MAG/GiZ in relation to sustainable agriculture practices implemented by small farmers has demonstrated the economic benefits of implementing minimum tillage, green fertilizers and agroforestry. Zero tillage requires less human labour, thus reducing costs and allowing for greater profit margins. In the medium to long term the productivity increases and the overall condition of the soil improves. A case study on agroforestry demonstrated that pineapples grown in shaded areas mature at a slower rate, thus enabling sale towards the end of the harvesting season at higher prices. Also, the use of green fertilizers has proved to greatly contribute to the overall quality of soil nutrients. For instance, green fertilizers decrease unwanted weeds and along with crop rotation practices allows for sustainable agriculture with higher yields. Higher yields may generate more income for farmers and also generate more food for the families and for small farm animals. It was observed that with more food for farm animals, families were able to keep more livestock as a source of meat and other goods, and even trade or sell these smaller farm animals in times when agricultural yields were less reliable or during non-harvest months. The surveys reported increases in yields of 55% for maize, 18% for manioc,

20% for beans, 14% for sesame, and 33% for cotton as a result of the application of the promoted practices promoted. These increased yields demonstrate that it is feasible to improve the socio-economic conditions of the target groups with the promotion of the proposed practices. One of the greatest advantages of zero tillage and the use of green fertilizers is the substantial savings in labor costs of 44%, which is the greatest expense of producers. Over 95% of project beneficiaries reported increases in yields and other benefits such as, less slash (clearing), less unwanted weeds, less labor hired, and more humidity levels in the soil, all this with coupled with higher incomes. As a result of lower costs and increased yields, incomes increased between 55% and 75%.[68]

With the implementation of concrete adaptation measures proposed in component 2, these will have a direct positive economic impact on agriculture and social benefits will be enhanced through the cooperation and involvement of the various producers' organizations in the pilot zones.

The actions and crosscutting approaches of this project will be sensitive towards gender issues to foster equal participation of women. Each cultural and ethnical group will be taken into careful consideration to help preserve and value the traditional knowledge, practices and customs of each community. Special attention will be given to the several indigenous communities to ensure that all their rights and customs are respected, and their environments are kept in a healthy balance when implementing adaptation measures.

An important social benefit linked to women's participation and empowerment will be enabling them to reproduce and instill cultural values and other practices into their children that are adapted to climate change and geared towards sustainable manners of subsistence. By empowering women through training, awareness and engagement in activities that promote adaptation and resiliency, the next generation will be better equipped to deal with climate change and food security issues. This will aid the project in being more sustainable and allow it to endure during and beyond its completion.

The communities will also benefit by having healthier environments, with more resilient ecosystems through the implementation of conservation and restoration practices. This will be particularly relevant for indigenous communities in terms of providing them with food and other vital resources from conserved and/or restored forests within the context of their traditional relationships with the forest. The approach to sound food production and environmental benefits is based on ensuring the overall health of ecosystems in terms of water quality and quantity, restoration of protective environments, soil protection and conservation of biodiversity. In this manner, the vision of this project aims to encompass actions with comprehensive benefits for the communities and subsequently reduce vulnerability.

Project interventions will also indirectly benefit other communities neighboring the pilot sites through increased biodiversity in rivers and streams as a result of conservation and restoration activities and improved quantity and quality of water. Urban areas will benefit from the healthier environments (e.g. cleaner waters) and more reliable access to food products produced by the target groups.

[68] GiZ. Manejo Forestal y Agricultura de Conservación: Experiencia de pequeños productores en la Región Oriental de Paraguay. MAG-GiZ-KFW. 2011

Table 13: Environmental, social and economic benefits

Environmental Benefits	Social Benefits	Economic Benefits
• Increased levels of soil humidity, stability and fertility • Increased resilience of agro-ecosystems to extreme weather events and climate variability • Pest and disease regulation • Increased water quantity and quality • Biodiversity conservation • Carbon storage	<u>Family producers:</u> • Increased knowledge and means to respond to climate change risks • Increased availability of wood for fuel and housing • Increased availability of non-timber products (edible and medicinal plants) • Increased and diversified availability of food throughout the year	<u>Family producers:</u> • Increased crop yields • Diversified production available for selling throughout the year • Increased production of milk and small farm animals • Increased production of crafts • Lower production costs • Enhanced incomes
	<u>Indigenous peoples:</u> • Increased knowledge and means to respond to climate change risks • Increased availability of wood for fuel and housing • Increased availability of non-timber products (edible and medicinal plants, raw material for crafts) • Increased and diversified availability of food throughout the year • Indigenous peoples will be able to maintain and carry on their traditional activities related to forests (hunting /gathering/cultural/religious)	<u>Indigenous peoples:</u> • Increased crop yields • Increased production of crafts • Enhanced incomes (if subsistence levels surpassed and surplus available for sale)

3. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.

Based on consultations with government authorities, the National Communications to the UNFCCC, and academic literature, an agro-ecosystem based approach that utilizes eco-agriculture practices is thought to be a cost-effective way to reduce the vulnerability of food production in the project areas.

The 2nd National Communication to the UNFCCC, as well as the SEAM/UNDP *Study on Investment and Financial Flows* have stated that on the basis of research and consultation with key stakeholders, cost-effective adaptation to climate change of the food production sector should include the promotion of public policies oriented to strengthening programs for restoration and conservation of protective forests, land zoning for proper use of land, increased use of climate-resilient crops with a focus on traditional varieties, sustainable livestock management with a focus on ecosystem-friendly approaches, sustainable soil management and efficient use of water. The project has been conceived on the basis of these elements, which reflect national priorities and strategies.

The proposed interventions are cost effective in that large infrastructural investments are not considered. The selected adaptive measures contained in the project consist mainly of a series of targeted activities designed to restore natural capital and achieve resiliency in food production systems as a means to reduce the vulnerability of rural communities. Restoring the natural capital of forests has multiple benefits for communities, and it is anticipated that the benefits will greatly exceed the costs.

The project will also build upon existing best practices and local knowledge, and will make use of the instruments that it will develop, to identify cost-effective technologies and practices and design a set of concrete climate change adaptation activities that will be tested in the pilot sites. The lessons learned will provide solutions for sustainable climate-smart agricultural production that can be consolidated and replicated beyond the life span of the project, thereby incorporating adaptive technologies into the current spectrum of conservation and development instruments in use.

Stakeholder participation at all project levels will contribute to the cost-effectiveness of the project. Participation will ensure adequate planning and implementation of activities in line with the project objectives and with the local development and stakeholder priorities, as well as complementarity with ongoing and planned programs and projects. At field level the project will benefit from the experiences and knowledge of government agencies, producers, indigenous peoples, NGOs, universities and other institutions.

The project will facilitate the development of community adaptation plans through participatory workshops at the local level to ensure a high level of community involvement, fostering empowerment and ownership of the project, and thereby strengthening the long-term sustainability of the project. Participatory workshops will serve the purpose of identifying local conditions (strengths, weaknesses and opportunities), understanding the needs of the community, especially in regards to adaptation, and identifying and prioritizing concrete adaptation activities. Community adaptation plans will contain specific goals, adaptation activities, implementation arrangements and commitments by the project, partner institutions and beneficiaries. A key component of the community adaptation plan will be a monitoring and evaluation plan in order to track the progress and results of the implemented project activities. The monitoring and evaluation plan will include a set of indicators that will be used to measure the outcomes of each activity.

Participatory workshops will be tailored to each beneficiary group to maximize the adoption of the project activities, and to ensure that they are in accordance with existing

experiences[69]. Workshops with farmers and their organizations will be carried out to introduce the project, conduct community assessments, and identify activities and establish goals and commitments. When needed, the workshops will be conducted in the Guarani language for those farmers who may not be fluent in Spanish. In the case of indigenous communities, the process will include preliminary visits to the communities to provide them with sufficient information on the project and to allow the community leaders and its members to discuss the project among themselves first prior to the workshops, thus respecting their own processes and timing in regards to internal consultation and decision making. After the communities have discussed the expectations and potential benefits of the project, the workshops will be conducted in order to identify and prioritize project activities taking into account their traditional practices. This process has been proven to facilitate the successful participation of indigenous communities, and hence in achieving a proper needs assessment and the establishment of proper goals. Communication will take into account native languages with an adequate cultural approach to ensure proper understanding and contribution. In all cases, participation of women will be fostered to ensure an equitable participation and a more comprehensive vision at the community level.

Project funds will cover the following types of costs and on-the-ground investments that will be included in the community adaptation plans:

- Awareness raising and training of project beneficiaries (producers and indigenous communities, and their organizations);
- Technical assistance to beneficiaries and their organizations;
- Subprojects to finance investments at different levels: individual farms; community subprojects for farmer committees/organizations, and subprojects for indigenous communities.

Local consultative groups will be established in the areas of intervention to ensure engagement of beneficiaries, to help identify and prioritize activities in the areas of intervention as well as to overview the implementation and progress of the selected activities at field level. These groups will include representatives from each of the beneficiary groups, implementing partners and sub-national governments (departments and municipalities).

Project activities such as awareness raising, training and technical assistance for implementation of sub-projects will be carried out by relevant national agencies, universities and NGOs. The project will identify those NGOs that are working effectively and directly with local communities in the areas of intervention. Multi-party agreements between SEAM and the implementing partners and municipalities will be established for the design, implementation and monitoring of sub-projects and specific activities. These agreements will also include the process for ensuring that the project funds are made available and distributed to the local communities.

Under Component 1, financial mechanisms will be identified and assessed for their cost-effectiveness. Based on the results from the feasibility analysis, only the financial

[69] GiZ. Manejo Forestal y Agricultura de Conservación: Experiencia de pequeños productores en la Región Oriental de Paraguay. MAG-GiZ-KFW. 2011

mechanisms that are the most cost-effective and appropriate for the local project area will be piloted under Component 2, and hence not all of the identified financial mechanisms will be piloted.

4. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

The project is consistent with the National Environmental Policy and will contribute to the implementation of several strategies contained in the policy, such as restoration of protective ecosystems and safekeeping and management of water resources. The project is aligned with the recently approved Climate Change Policy in regards to several of its priority sectors, namely Food Sovereignty and Security, Water Resources, Forests and Biodiversity and the policy´s strategic pillars.

The project has been conceived within the four pillars of Paraguay's National Climate Change Policy, namely:

- Strengthening of institutional capacities. The objective of this pillar is to strengthen the institutional capacities to provide adequate responses to climate change issues and to foster partnerships that include the private sector and civil society, as well as strengthening the legal and regulatory framework for an adequate implementation of the policy.
- Financing: The objective of this pillar is to mobilize financial resources to confront the impacts of climate change.
- Education, communication and participation: The objective of this pillar is to improve understanding and mainstreaming of climate change issues at national level.
- Management of knowledge and technology: The objective of this pillar is to develop and mainstream knowledge management and scientific and technical instruments for adaptation and mitigation of the impacts of climate change.

In this sense, the project will spearhead the development of instruments and measures to adapt to climate change, and will pilot their implementation in the productive landscape in selected rural areas of the country with the purpose of generating experience and lessons learned that will enable further replication on a more systematic basis throughout the country. At the same time, the project will strengthen the capacity of relevant stakeholders to create an enabling environment for effective implementation of climate change adaptation in Paraguay. The project will thus contribute to the National Climate Change Policy´s objective of mainstreaming climate change issues at national level and promoting the implementation of coordinated measures that is coherent with the national development priorities, the international commitments and sustainable development.

The project will develop and test instruments, tools and measures specific to the above areas that will enhance stakeholder capacities to make decisions and implement CCA, reduce their vulnerability to climate change and increase resiliency of communities and ecosystems. The project is in accordance with SEAM´s goals and policies on safeguarding and restoring ecosystems that are being fostered through several instruments, such as the Chaco Environmental System, Eastern Region Environmental System, National Protected Areas System, land zoning plans, etc. These instruments currently provide an array of information; however lack information on climate change impacts and vulnerability and adaptation practices.. The tools, information, knowledge, and lessons learned by this project will contribute to mainstreaming climate change issues and CCA in particular, into these instruments, thereby enhancing their current scope.

The project is consistent with the MAG´s Agrarian Strategic Framework 2010-2018, which prioritizes food security by family agriculture and indigenous peoples, and three of its main programs are, the National Programme to Support Food Production by Family Agriculture (PPA), and the National Programme for Indigenous Peoples Economy and Agriculture (PAI). The project will coordinate activities with these programs to ensure complementarity and will benefit from the information and experience gained by these programs in the field. The project is also aligned with the objectives of National Plan for Food Sovereignty and Security (PLANAL), which seeks to reduce food insecurity and malnutrition.

The project is also consistent with the National Forest Policy, the National Forest Action Plan and INFONA´s Strategic Plan 2009-2014 in regards to forest conservation, restoration and management. The project will implement adaptation related measures within the framework of several forest sector regulations, namely the Forest Law, the Afforestation/Reforestation Law, and the Law for Restoration of Protective Forests in the Eastern Region and Forest Conservation in the Chaco.

The project is also consistent with the Social Development Public Policy (PPDS) which prioritizes the attention to vulnerable groups, among them small holders and indigenous peoples, through various strategic objectives, one of them being food security, and taking into account cross-cutting issues (gender and environment).

Finally, this project is consistent with the Millennium Development Goals (MDG), in promoting Goal 1 *Eradicate hunger and extreme poverty,* Goal 7 *Environmental Health and Sustainability*, and Goal 3, *Promote Gender Equality and Empowering Women*; as this last one will be a strong cross-cutting issue that will be taken into account in implementing adaptation activities with communities and social groups.

5. Describe how the project / programme meets relevant national technical standards, where applicable.

Required environment and social safeguards will be followed and incorporated into the project design. In addition, the proposed interventions will adhere to all national

technical standards that are in force, particularly those relating to the agricultural and forest sectors.

The project will be designed in order to be consistent with national priorities, promote inter-institutional coordination and collaboration, have active stakeholder participation in planning and decision making, carry out sustainable and environmentally-friendly land uses and practice and develop tools and instruments to enable adequate decision making. Project design will also take into account institutional strengthening and capacity building in accordance with specific needs and priorities identified in existing capacity assessments and in the Climate Change Policy.

There are currently no relevant national standards for forest restoration or conservation/ protection in Paraguay. However, international best practice standards will be followed throughout the project.

Capacity building and participatory mechanisms will contribute to the adoption of adaptive technologies and practices by producers and indigenous communities. The project will promote social equality by prioritizing as its target groups the rural population and indigenous peoples, which are recognized as a vulnerable population to the effects of climate change.

In regard to gender equity the project will encourage the involvement of women in the processes required to implement climate change activities. Specific activities to foster the participation of women will be identified during project preparation.

The project will also put in place a Monitoring and Evaluation (M&E) system with the objective of providing accurate and timely information and feedback on project implementation and performance. The M&E system will enable project management to make decisions that address issues as they arise, thus ensuring that the above conditions are met during project implementation and contribute to the achievement of project components and objectives (an M&E plan will be included in Part III, section C).

6. Describe if there is duplication of project / programme with other funding sources, if any.

The specific adaptation activities proposed in this project are not duplicated by other projects or initiatives. Nevertheless, there are several programs and projects with which the proposed project will seek complementarity.

Table 14: Synergies and complementarities with ongoing projects

Title of Project	Partner/Funding partner	Objective	Amount (Million US$)
UN-REDD Programme	SEAM / UNDP-FAO-UNEP	To support Paraguay to achieve REDD-readiness through conservation and sustainable management of forests and carbon stocks. The programme will provide support to prepare a REDD	4,720,000

		national plan, developing instruments to implement REDD at national and local levels, and strengthening stakeholder capacities to implement REDD activities. The programme is currently in the start-up phase. ***Linkages:*** The project is in its start-up phase. UN-REDD will carry out the National Forest Inventory that will provide accurate information on the state of forests in the country. The information produced will be useful to the AF project in terms of designing and implementing forest conservation and restoration activities. SEAM is one of the executing agencies of UN-REDD therefore periodic information exchange meetings and/or workshops will be conducted to ensure coordination and complementarity.	
PRODERS - Sustainable Rural Development Project	MAG / World Bank	To Improve the quality of life of small farmers and indigenous communities; it also focuses on the issue of family farming in the areas of reduced production, due to the limitation of access to credit and other financial resources, and institutional constraints and public policy. The project places high priority on indigenous communities to address poverty rates and degradation of their land. Provision of the necessary skills to overcome specific natural limitations to enable them to perform traditional farming practices to promote diversification and conservation. ***Linkages:*** PRODERS has been active in the Department of San Pedro working in selected micro-catchments in the different districts. Experience acquired by the MAG through PRODERS will be of great value for the AF project. In fact, activities already proven in the field by PRODERS in natural resource management have been taken into account among the proposed AF practices. Information sharing will benefit both projects and the AF project may provide an added value to PRODERS in terms of mainstreaming specific adaptation measures into this project.	46,730,000
Sustainable Forest Management in the Transboundary Gran Chaco Americano Ecosystem	SEAM / UNEP-GEF	To improve the socioeconomic conditions of the inhabitants of the Gran Chaco by preserving, conserving and restoring the ecosystem, through addressing their needs, expectations and demands of the various actors or communities involved. Sustainable natural resource	1,477,582

		management and support for the small scale producer. The project is currently in start-up phase. ***Linkages:*** The project is in its start-up phase. This project includes a pilot component to implement research and field activities related to sustainable management of natural resources in 11 sites throughout the Chaco. The district of Teniente Irala Fernandez is shared by both this project and the AF project as an intervention area. Both projects will benefit from information sharing on best practices to be applied and the AF project will provide an added value to this project in terms of concrete adaptation measures not foreseen by the PASChaco. Since SEAM is the executing agency of both projects, periodic information exchange meetings and/or workshops will be implemented to ensure coordination and complementarity.	
Paraguay Biodiversity: Improving the Conservation of Biodiversity in the Atlantic Forest of Eastern Paraguay	SEAM-Itaipú (Paraguay) / WB-GEF	To assist the government in its efforts to reduce the deforestation rate and associated biodiversity loss within the productive landscape of the Alto Paraná Atlantic Forest, through development of connectivity within a conservation corridor (both in private and public lands); improving the protected area system, and strengthening the policy framework and enforcement mechanisms. These corridors are to be sustainably managed and supported by Public institutions providing adequate information, services, and monitoring and enforcement on forest and biodiversity conservation within the Atlantic Forest. ***Linkages:*** The project is in its start-up phase. Although this project and the AF project will be implemented in different departments of the Eastern Region they could both benefit from information sharing on best practices applied by each project in their respective intervention areas. Since SEAM is one of the executing agencies of this project, periodic information exchange meetings and/or workshops will be implemented to ensure coordination and complementarity.	10,500,000
Alliance for a Sustainable San Pedro	Fundacion Moises Bertoni – Desarrollo Agricola del Paraguay / USAID	Seeks to harmonize economic development and environmental protection in forested areas through elimination of slash and burn practices, restoration of forests within the	NA

		watersheds of the Jejui and Ypane Rivers to establish a corridor in the Alto Parana Atlantic Forest, technical assistance to improve production of food and cash crops as well as their commercialization. ***Linkages:*** The AF project intervention area in Eastern San Pedro is also located within the watersheds of the Jejui and Ypane Rivers. The AF project could benefit from information sharing on best practices already being applied by this project. At the same time the AF project may provide an added value to this project in terms of climate change adaptation measures.	
Conservation and Sustainable Management of the Chaco and Atlantic Forest	World Conservation Society / USAID	Seeks to reduce the rate of deforestation and degradation of biodiversity by identifying and promoting models for sustainable use of natural resources as well as increasing the area covered by private reserves. The project works with large landowners in the Chaco to promote sustainable use of natural resources and in the Eastern Region to promote reforestation and establishment of private reserves. ***Linkages:*** The AF project will develop and pilot the "legal adequacy" scheme incorporating a fiscal incentive component aiming at promoting forest restoration activities by large landowners. The AF project could provide lessons learned on this scheme that could be adopted and promoted by this project.	NA

The project will build upon past and on-going assessments and studies, such as the National Communications to the UNFCCC and CBD, capacity assessments, the study on flows of investment funding (SEAM/UNDP) and the studies on economics of climate change (SEAM/ECLAC).

7. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

The project has been conceived as a demonstration mechanism to enhance capacities to implement measures directed to strengthen climate change adaptation. In this regard, the identification of lessons learned will be a key activity of the project. The Monitoring and Evaluation Plan to be developed will pay special attention to capturing lessons learned to up-scale project results to other areas and vulnerable communities of the country. Project Component 1 will develop a series of tools and instruments that will

be applied in the pilot sites and will serve as the basis for replication.

Project Component 2 will develop a range of concrete climate change adaptation activities that will be founded upon the identification of best practices, appropriate technologies and lessons learned that will be mainstreamed into best practice manuals and guidelines. Participatory development of these tools and instruments, as well as in development of pilot activities will ensure the endorsement by stakeholders, therefore contributing to successful future replication efforts, especially in geographical areas and communities with similarities to the pilot areas.

Several programs and projects have been identified at this stage, which can mainstream the experiences and lessons learned into their work programs. Up-scaling will be facilitated by Component 3 through training, awareness-raising and information activities that include: i) the establishment and maintenance of a project website, ii) a project newsletter, iii) training and outreach programs aimed at relevant stakeholders (decision makers, technicians, professionals, producers and indigenous peoples, etc.) that may include field exchange visits, information materials, training workshops and events, among other activities, and iv) events for dissemination of the project results and lessons learned and to promote exchange of experiences. At a global level, UNEP will facilitate access to the lessons learned through global initiatives such as UNEP´s Ecosystem Management Programme and their information sharing mechanisms.

8. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation.

This project reflects the main pillars and crosscutting approaches of the National Climate Change Policy. SEAM´s climate change officials, consultants and advisors were involved in the consultative process. This project took a multi-interdisciplinary approach towards the consultative process to ensure that the target of the project encompasses all the relevant sectors, stakeholders and beneficiaries. Other government agencies that took part in the consultation process that took place in November 2011 were the Agrarian Technology Institute, National Emergency Secretariat, National Plant Health Service, National Forest Service, and the Ministry of Agriculture and Livestock. Two additional consultation workshops took place in March 2012 to review the project concept and identify the project´s pilot sites. Representatives from SEAM, National Institute for Rural Development and Lands, Meteorology Directorate, Ministry of Finance, National Emergency Secretariat, Ministry of Industry and Commerce, Women´s Secretariat, the NGOs Mingara, Sobrevivencia and Tierra Libre, and the Association of Rural Producers of Paraguay participated in these workshops. The main issues discussed during these workshops dealt with the future climate scenarios developed by the 2nd National Communication, the areas of the country to be most severely affected by climate change as well as the criteria to select the areas of intervention. The five criteria taken into account were:

- Climate vulnerability (exposure and sensitivity to climate change);
- Social vulnerability of family producers and indigenous peoples (low adaptation capacity);

- Availability of relevant information (production systems, agricultural practices, existence of ongoing programs and projects);
- Diversity of production systems and target groups (combination of family agriculture and indigenous communities);
- Ecosystems with potential to provide services to agriculture.

The Northern part of the Eastern Region and the dry Chaco are the areas that comply with the criteria. Within these areas, the Eastern part of the department of San Pedro (Eastern Region) and the district of Teniente Irala Fernandez (Chaco) have been identified for project intervention. The specific pilot sites for implementation of project activities will be selected through further consultations during preparation of the full-fledged proposal.

9. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

The funding requested will make a significant contribution to the full costs of climate change adaptation in each of its three components by strengthening awareness, experience and expertise in the significant value of ecosystem-based approaches within a comprehensive climate change adaptation strategy. The cost of inaction by not strengthening the resiliency of ecosystems and use of eco-agriculture practices on the loss of food production over time through the components described in this proposal would be many times greater than the cost of the funding requested.

Component 1: Knowledge management of vulnerability and resilience to climate change improved with tools and instruments to implement cost-effective adaptation measures

Baseline: Climate change is a relatively new subject in Paraguay and it is only in the last few years that it has started being taken into account in public policy and development practices. The National Climate Change Policy has been recently developed and approved, which demonstrates the growing recognition that there is a need to address climate change. Nevertheless, there is still a lack of information and knowledge on the subject. Several studies have been carried out that identify and propose general adaptation measures (e.g. 1st and 2nd National Communications, SEAM/UNDP *Study on Investment Flows*; SEAM/ECLAC *Economic Study on the Impacts of Climate Change*); however there are no specific and concrete proposals for adaptation at local levels that take into account ecosystem and community based approaches.

Additionality: In this context, the project will generate information and develop instruments that currently do not exist, thus improving the knowledge base on climate change vulnerability and adaptation practices, including a strong focus on ecosystem-based approaches to reduce the vulnerability of food production. These instruments will be used to support the testing of "on-the-ground" adaptation measures in pilot sites (Component 2). The development of the instruments will be used at the pilot site level and it will be possible to use the experience and knowledge gained to design relevant adaptation measures in other areas and at the national level; therefore contributing to future replication. As a result of these project activities, government agencies will be strenthened to better understand vulnerability and identify measures to adapt to the

impacts of climate change, including the benefits of having resilient ecosystems and practicing eco-agriculture, and hence implement concrete actions in the field to help communities to adapt.

Component 2: Adaptive capacity in rural areas of greatest vulnerability strengthened through concrete ecosystem services and agro-ecosystem based adaptation measures.

Two projects are being implemented in the Chaco, namely: (i) the *Conservation and Sustainable Management of the Chaco and Atlantic Forest* project seeks to reduce the rate of deforestation and degradation of biodiversity by identifying and promoting models for sustainable use of natural resources as well as increasing the area covered by private reserves. The project works with large landowners in the Chaco to promote sustainable use of natural resources and in the Eastern Region to promote reforestation and establishment of private reserves, (ii) the project *Sustainable Forest Management in the Transboundary Gran Chaco Americano Ecosystem* has the objective of improving the socioeconomic conditions of the inhabitants of the Gran Chaco by preserving, conserving and restoring the ecosystem, on the basis of the needs, expectations and demands of the various stakeholders or communities involved in the project; sustainable natural resource management and support for the small scale producers.

However, past and current initiatives have failed to adequately consider the impacts of climate change or to address these impacts effectively taking into consideration the services provided by resilient ecosystems and the value of relevant traditional and agro-ecosystem practices. There is currently a limited understanding of the requirements to implement climate change adaptation measures, and particularly ecosystem-based adaptation. Commercial producers and communities carry out some activities that are related to adaptation (e.g. selection of crop varieties, agro-forestry, silvo-pastoral grazing systems); however these activities have not been conceived as climate change adaptation measures due to lack of access to information and knowledge on climate change adaptation and ecosystem resilience. Moreover, government programs and projects usually do not take into account traditional knowledge and traditional agricultural practices that are often (although admittedly not always) well suited to adapting to a changing climate, and therefore such programs and projects do not benefit from such traditional and locally adapted technologies and practices. As a consequence, limited financial resources are allocated to implement concrete adaptation actions that take into account traditional knowledge. This situation generates a cycle in which limited funding availability limits the development of technical and operational capacities at all stakeholder levels, as well as the meaningful integration of climate change adaptation measures based on ecosystems, and relevant traditional practices for agriculture and livestock production, and their cost effective contribution within a comprehensive national adaptation strategy.

Additionality: The funding requested through this project will be a strategic investment that will significantly contribute to the development and implementation of the cost of adapting to climate change in Paraguay. Additional adaptive activities provided by the project will provide opportunities for designing and testing concrete adaptation actions at field level. The project will design and pilot the implementation of a set of targeted

ecosystem-based activities that will reduce the vulnerability of agriculture and livestock production by ensuring freshwater regulation, flood control, climate regulation, invasive alien species regulation, nutrient cycling, and soil formation. In this manner, the target groups will shift from their current practices to practices that allow them to adapt, thus enhancing the sustainability of their productive systems in the context of climate change, and making a significant contribution to reducing the full cost of climate change.

Component 3: Capacity development and awareness to implement and upscale effective implementation of adaptation measures at the national and local levels.

Baseline: As stated, there is a lack of awareness, knowledge and skills related to climate change adaptation, particularly in ecosystem-based approaches. This situation affects all levels of government (central, departmental and municipal) and relevant stakeholders (e.g. policy makers, universities).

Additionality: To tackle this situation, the project will develop and implement training programs, which for the first time will take into account climate change adaptation, hence strengthening the capacity of government agencies and other key stakeholders involved in project execution to implement the activities foreseen by the project. The project will also collaborate with ongoing and planned field programs and projects mentioned in the description of Component 3 (Section A) and the table of complementarity with other projects (Section F) and to mainstream the experience and lessons learned into their work-plans, thereby contributing to up-scale adaptation measures to other areas of the country. In the long term, enhanced stakeholder capacities will enable them to effectively respond to climate change impacts. These contributions will also significantly contribute to the cost of climate change in Paraguay.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

The Project will be executed by SEAM. SEAM has established a National Office for Climate Change and a National Programme for Climate Change (PNCC). The PNCC has the objective of evaluating and implementing actions in relation to Paraguay´s commitments under the UNFCCC. SEAM has developed the National Climate Change Policy.

SEAM will establish a Project Management Unit (PMU), which will be responsible for implementation of project activities. The PMU will prepare annual work-plans, progress reports and will carry out the project M&E plan. The PMU will be in charge of coordinating activities under each component with the different government agencies that will collaborate and be involved in the project execution. The PMU will also be responsible of ensuring adequate stakeholder participation.

A national level Steering Committee will provide overall guidance and supervision. Representatives of SEAM and UNEP will comprise the Steering Committee. Other key

stakeholders may be invited to be part of the Steering Committee. Potential members will be identified during project preparation.

At the local level, Local Coordination Committees will be established in each pilot site to ensure adequate local level coordination and participation of key local stakeholders and representatives of the target groups. Further details on project management will be provided in the full-fledged proposal.

B. Describe the measures for financial and project / programme risk management.

A preliminary list of risks and risk management measures is included in the following table.

Table 15: Risks and risk management measures

Risk	Risk management measures
Lack of adequate coordination, collaboration and cooperation among the executing agencies delays project implementation	Operational agreements between implementing partners and agencies with adequate definition of roles and responsibilities. Dialogue and consensus building.
Frequent changes and rotation of staff in local implementing agencies may affect availability of qualified staff	Training. Information and communication. Inter-institutional agreements that provide a framework for designation of qualified staff. Awareness raising among authorities. Strengthening of target groups for implementation of activities.
Lack of buy-in and participation of key stakeholders and target groups, and conflicts or differences between stakeholders/groups may weaken and delay implementation of activities	Capacity building, training and awareness raising. Participatory processes to promote engagement and inclusion of all interested parties. Representation of key groups and stakeholders in the steering committees and field activities. Mediation in case of conflicts between stakeholder groups
Instruments to be developed by the project could take longer periods to provide tangible results than the project´s lifetime (e.g. research and fiscal incentives)	Prioritization of research activities that can be effectively designed and implemented within project lifetime. Inclusion of long-term research in institutional work plans. Awareness raising and lobbying among authorities for approval of fiscal incentives within a period that will ensure sufficient timing for field piloting.

C. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

The project will follow UNEP standard monitoring, reporting and evaluation processes and procedures. These include an inception report, quarterly and annual financial and activity-based reports; annual financial audits, independent mid-term and terminal evaluations and a final report. During preparation of the full-fledged proposal a Project Results Framework and a costed M&E plan will be developed. The Project Results Framework will include SMART indicators as well as means of verification for each

component and expected outcomes. These indicators will be a key element in assessing project implementation progress and whether project results are being achieved.

D. Include a results framework for the project proposal, including milestones, targets and indicators.

A full Results Framework, including SMART indicators, will be developed in the course of the detailed project preparation to serve as the basis for monitoring the project impact and results.

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT[70] *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Rodrigo Mussi Buzarquis Director, Strategic Planning Directorate, Secretariat of the Environment	Date: 01/09/2012 (see annex III for the LoE)

B. IMPLEMENTING ENTITY CERTIFICATION *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (National Climate Change Policy) and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Ibrahim Thiaw, Director, Division of Environmental Policy Implementation, UNEP Implementing Entity Coordinator	24/04/12
Date: 23 April 2012	Tel. and email: Ibrahim.thiaw@unep.org +254-207624782
Project Contact Person: **Mr Jason Spensley (LAC Adaptation Officer)**	
Tel. And Email: Jason.spensley@unep.org	

6. Each Party shall designate and communicate to the Secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

Annex 1. Climate Scenarios for Paraguay

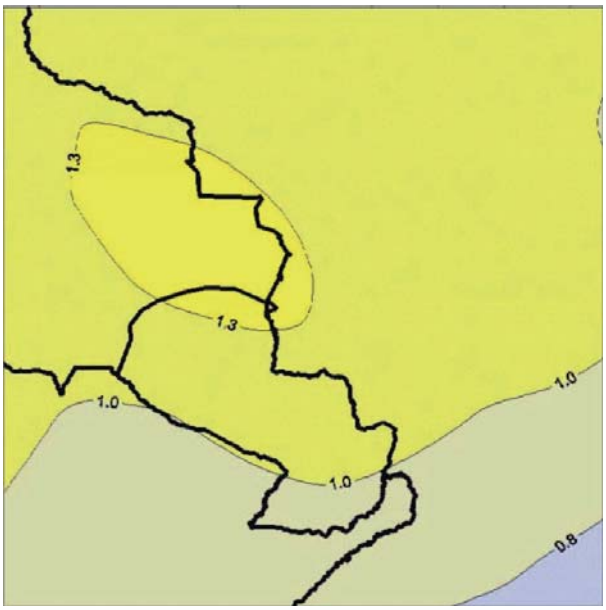


Figure 1: Changes in temperature (°C) for the decade of 2020 in Paraguay and interest region (SRES A2)

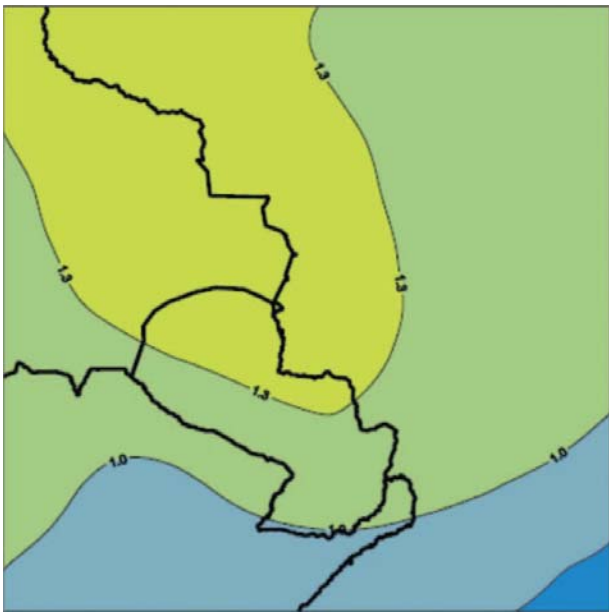


Figure 2: Changes in temperature (°C) for the decade of 2020 in Paraguay and interest region (SRES B1)

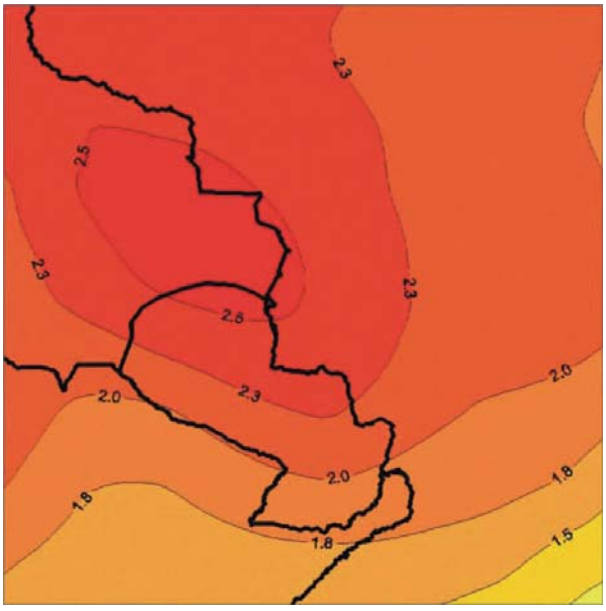


Figure 3: Changes in temperature (°C) for the decade of 2050 in Paraguay and interest region (SRES A2)

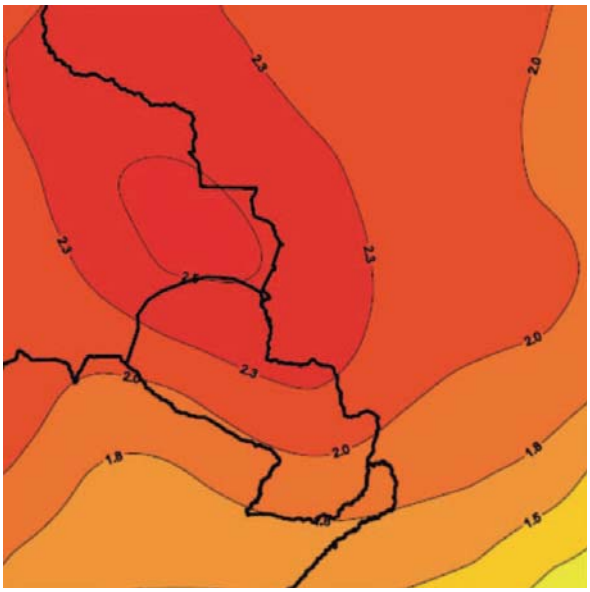


Figure 4: Changes in temperature (°C) for the decade of 2050 in Paraguay and interest region (SRES B1)

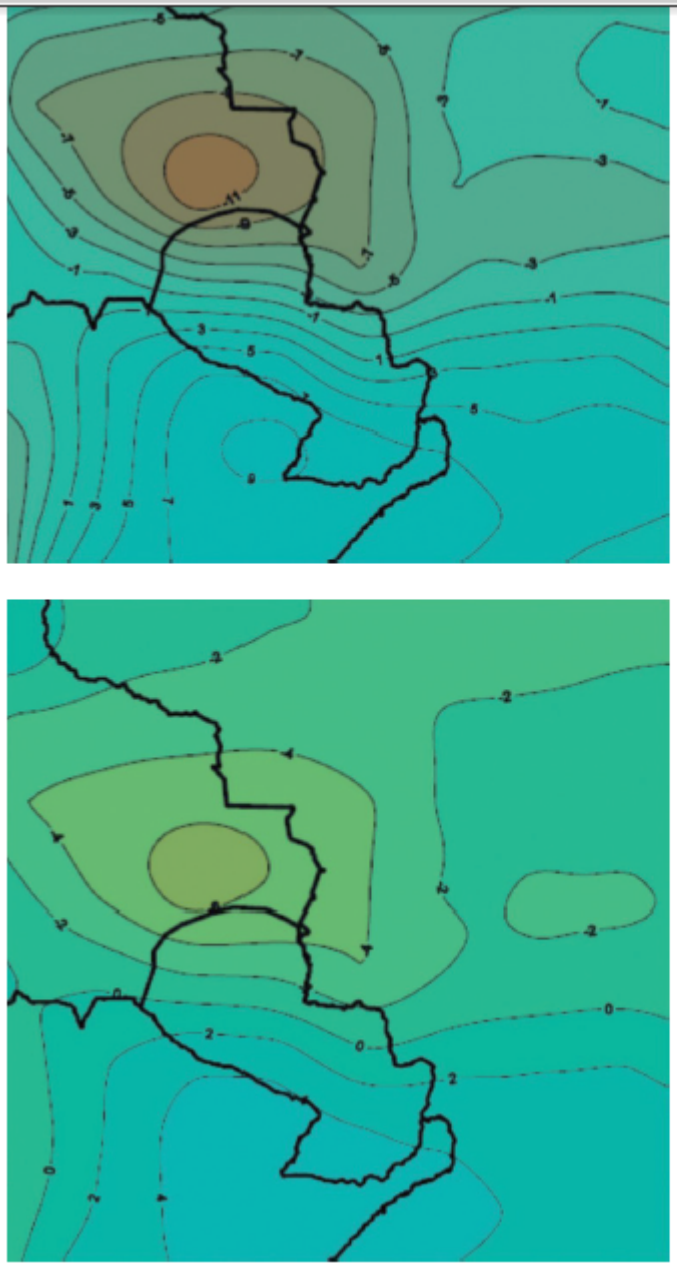
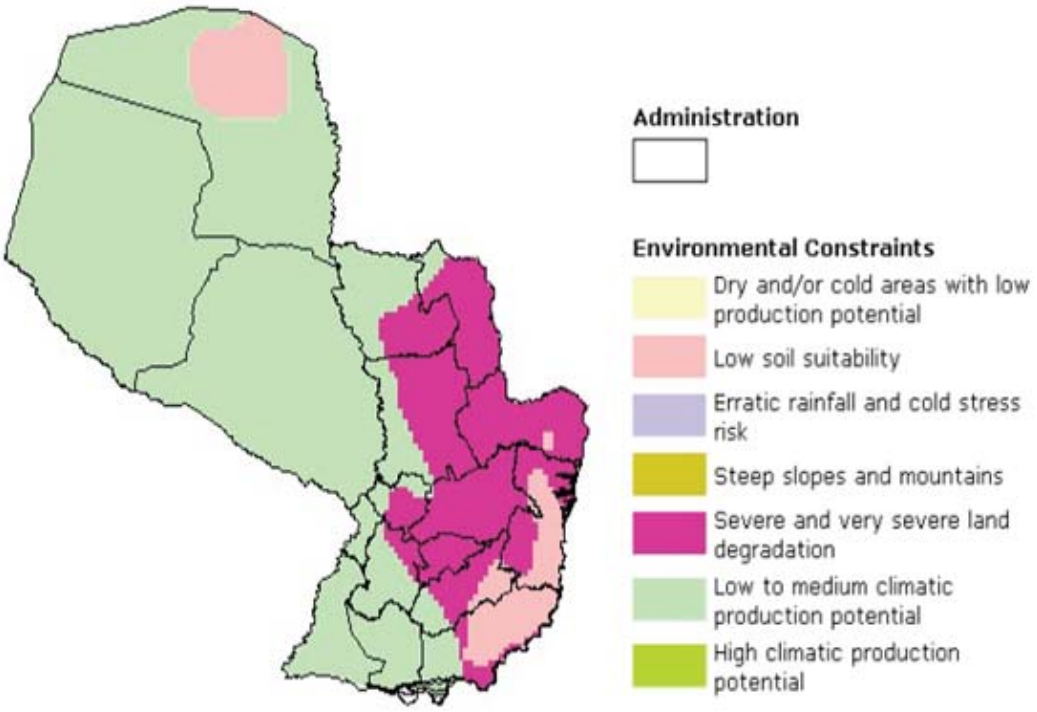


Figura 6: Cambios en la precipitación (%) para la década de 2020 en el Paraguay y región de interés (SRES B1)

Annex 2. Map of Environmental Constraints in Paraguay.



Source: FAO

Annex 3. Secretaría del Ambiente: Política Socio-ambiental con Enfoque de Derecho[71]

La SEAM promueve una política socio-ambiental con enfoque de derecho, que incorpora los vínculos entre poblaciones y los ecosistemas en los cuales dichas poblaciones viven y llevan a cabo sus actividades sociales, culturales y económicas.

En este sentido la propuesta de Proyecto "Enfoque ecosistémico para la reducción de la vulnerabilidad de la producción de alimentos a los impactos del cambio climático en la Región Oriental y el Chaco" es una herramienta propicia para iniciar reales procesos de recuperación, restauración y conservación de los ecosistemas nativos y en consecuencia la preservación de culturas Indígenas.

Convenientemente aplicado, aportara contribuciones concretas y viables para la pervivencia de tales culturas en respetuosa interacción con la biodiversidad, avanzando a su vez en el desarrollo de conectividades, restauraciones territoriales, sociopolíticas y culturales a través de sus tierras, recursos naturales y ecosistemas y en atención a sus autonomías, características y organizaciones particulares.

En este contexto, y en el marco de sus derechos a la participación y a la defensa de sus tierras y recursos naturales, es preciso posicionar una estrategia diferenciada y específica tanto en el diseño, ejecución y seguimiento de las dinámicas de los procesos de la restauración entendida ésta como trabajo altamente interdisciplinario con programas y actuaciones a corto, mediano y largo plazo.

Los pueblos indígenas no han adoptado prácticas generalizadas perjudiciales para explotar sus recursos naturales y es la pervivencia de conocimientos y técnicas apropiadas las que hacen posible la permanencia de la diversidad biológica.

El Convenio 169 de la OIT, al dar cuenta de la relación esencial entre pueblos indígenas y su patrimonio cultural, afirma y garantiza la pertinencia de no separar los conocimientos y prácticas de su contexto geográfico-ecológico; puede acontecer incluso la separación de tales conocimientos de las comunidades de origen de los colectivos indígenas, facilitándose así adversamente la comercialización de los recursos culturales indígenas.

La vigencia de los derechos colectivos reconocidos a los pueblos indígenas tiene por objeto la protección de la dignidad humana, la autonomía, el derecho a la participación, tierra, territorios y recursos naturales, las políticas públicas deben ser de inclusión, sustentables y basadas en tales derechos. Ello implica el reconocimiento de las instituciones indígenas (socioculturales y políticas) y del valor de sus diversidades culturales, el reconocimiento y afianzamiento de sus identidades, y el protagonismo colectivo de estos pueblos, propiciándose el establecimiento de canales de gestión conforme sus propias orientaciones y ritmos, adecuados al manejo y control de sus

[71] Secretaría del Ambiente. 2011. Estrategias para la Aplicación de la Herramienta PAS Chaco en apoyo a los Procesos de Reivindicación de los Pueblos y Comunidades Indígenas del Chaco Paraguayo: Análisis

miembros y sistemas organizativos propios. Estos reconocimientos permitirán y garantizaran a su vez, que las organizaciones y/o comunidades indígenas den cuenta en sus respectivos procesos, de los límites económicos, ecológicos y culturales que consideren necesario establecer y preservar.

En consecuencia, la contribución de iniciativas, oportunidades y mecanismos ambientales deberían estar convenientemente administrados por las organizaciones y comunidades indígenas y garantizadas por los gobiernos y agencias multilaterales.

Política y Regulación de las Funciones de la SEAM

En efecto, la política y regulación de las funciones de la SEAM, se sustentan entre otras en:

- **La Constitución Nacional** que reconoce el derecho de los habitantes de Paraguay a la vida en un ambiente saludable y ecológicamente equilibrado y declara de interés social la preservación, conservación y mejoramiento del medio ambiente y su reconciliación con el desarrollo humano integral, como asimismo, reconoce la igualdad de derechos y de oportunidades de todos sus habitantes.

- **La ley 1561/2000** que crea el Sistema Nacional del Ambiente (SISNAM) compuesto por el Consejo Nacional del Ambiente (CONAM), como instancia deliberativa, consultiva y definidora de la política ambiental nacional y la Secretaría de Medio Ambiente (SEAM) órgano ejecutivo cuyo objetivo principal es la formulación, coordinación, ejecución, y fiscalización de la Política Ambiental Nacional (PAN).

- **Instrumentos políticos y estratégicos** tales como el *Plan de Política Pública de Desarrollo Social para Todas y Todos (2010-2020), Plan Estratégico SEAM 2009-2012, Plan de Acción para la Conservación de la Biodiversidad*, el *Programa Nacional de Cambio Climático y su Plan Quinquenal 2008-2012* , el *Plan de Acción Nacional para la Lucha contra la Desertificación*, el *Plan Nacional de Acción Forestal* en el marco de la Política Forestal, Sistema Nacional de Protección y Conservación de la Vida Silvestre (SINAVISI) 2010; el *Plan Nacional De Derecho Humanos 2011.* (Eje 1. Transformación De Las Desigualdades Estructurales Para El Goce De Los Derechos Humanos y Eje 4. Seguridad Humana (Ítems 5,6,7); otros.

- **Leyes relativas a la protección, regulación y gestión del medio ambiente** tales como, la *Ley 294/93 de Evaluación de Impacto Ambiental*, *Ley 751/95 de Combate al Tráfico Ilícito de Madera*, *Ley 716 de Delito Ecológico*, *Ley No 40/90 que crea la Comisión Nacional para la Defensa de los Recursos Naturales*, *Ley No 92/96 Vida Silvestre*, *Ley N° 253/93* que ratifica el Convenio de Diversidad Biológica; *Ley 2515/93 Cambio Climático*, *Ley 350/94 Sobre Humedales*, *Ley No 536/95 Forestación y Reforestación*, *Ley No 970/96 que ratifica la Convención sobre Desertificación*, *Ley No 816/96 Medidas para la Defensa de los Recursos*

Naturales, *Ley No 3239/07 de Recursos Hídricos*, *Ley No 1328/98 Derechos del Autor.*

Las garantías de los derechos indígenas establecidos en la *Constitución Nacional (Cap. V)*, la *Ley No 234/93* que ratifica el *Convenio 169 de la OIT*, la *Ley No* 904/81 Estatuto de las Comunidades Indígenas, cuya autoridad de aplicación en lo pertinente es la SEAM. Más concretamente, los fundamentos legales y políticos en materia de derecho indígena y de sus instituciones en defensa y protección de sus recursos naturales se instituyen en:

- **Constitución Nacional (CN) 1992. Capitulo V de los Pueblos Indígenas y grupos étnicos** Art. 65. *Se garantiza a los pueblos indígenas el derecho a participar en la vida económica, social, política y cultural del país, de acuerdo con sus usos consuetudinarios, esta Constitución y las leyes nacionales.* Art. 66. *El Estado respetará las peculiaridades culturales de los pueblos indígenas (...) Se atenderá, además, a su defensa contra la regresión demográfica, la depredación de su hábitat, la contaminación ambiental (...).*
- **Ley 904/81. Estatuto de las Comunidades Indígenas (ECI).** Art. 1o. *Esta Ley tiene por objeto la preservación social y cultural de las comunidades indígenas, la defensa de su patrimonio y sus tradiciones, el mejoramiento de sus condiciones económicas, su efectiva participación en el proceso de desarrollo nacional y su acceso a un régimen jurídico que les garantice la propiedad de la tierra y otros recursos productivos en igualdad de derechos con los demás ciudadanos*. Art. 7o*. El Estado reconoce la existencia legal de las comunidades indígenas (...).*
- **Ley 234/93 que ratifica el Convenio 169 de la OIT sobre Pueblos Indígenas.** Art. 7.7.4*. Los gobiernos deberán tomar medidas, en cooperación con los pueblos interesados, para proteger y preservar el medio ambiente de los territorios que habitan.* Art. 15.1*. Los derechos de los pueblos interesados a los recursos naturales existentes en sus tierras deberán protegerse especialmente. Estos derechos comprenden el derecho de esos pueblos a participar en la utilización, administración y conservación de dichos recursos.*
- **Ley 1328/98 Derechos del Autor y Derechos Conexos.** Art. 83. *Las expresiones del Folklore publicadas o no, serán protegidas permanentemente de su explotación inadecuada y de sus mutilaciones o deformaciones. Corresponde al Estado a través de la Dirección Nacional de Derechos del Autor y de las demás instituciones encargadas de velar por el Patrimonio Cultural tradicional, la defensa contra su explotación abusiva con los atentados a su integridad.*
- **La declaración de la ONU sobre los derechos de los Pueblos Indígenas (2007)** Art. 29. *Los pueblos indígenas tienen derecho a la conservación y protección del medio ambiente y de la capacidad productiva de sus tierras o territorios y recursos (...)* Art. 39. *Los pueblos indígenas tienen derecho a la asistencia financiera y técnica de los Estados y por conducto de la cooperación internacional para el disfrute de los derechos enunciados en la presente Declaración.*

Cuestiones a considerar

En consecuencia, la SEAM en el marco de su competencia, con base a su política socioambiental con enfoque de derecho y a la vez autoridad de aplicación de normativas en derecho indígena concerniente a la restauración de los ecosistemas y recursos naturales comprenderá que:

a. La antigua/actual posesión/existencia Indígena es igual a la respetuosa interacción con la biodiversidad e ir avanzando en las restauraciones o conectividades a través de las comunidades, tierras/recursos naturales de los Pueblos Indígenas algunos aun asentados en sus lugares tradicionales, pero mayormente en procesos de demandas y gestiones correspondientes para la legalización de sus tierras/territorios:

i. Entender que las Comunidades Indígenas constituyen entes autónomos, con sistema de autoridad propio y que además se rigen en base a derechos consuetudinarios y leyes específicas distintas a la de los demás actores/colectivos involucrados en el proyecto; en consecuencia introducir el componente/apartado correspondiente, reconociendo tales características y derechos, organizándolos proactivamente.

ii. Informar a las autoridades de las organizaciones representativas de los pueblos indígenas del área respecto al Proyecto (Objetivos, Alcances, Metodología, Rol/Competencia institucional).

iii. Desarrollar el componente y/o estrategia indígena del Proyecto en base a un abordaje responsable y congruente con las cuestiones relativas a los derechos y cultura de los Pueblos Indígenas.

iv. Producir información actualizada sobre el estado de salud de los recursos naturales o ecosistemas indígenas, uso de suelo, en base a imagen satélite y otras fuentes que permitan establecer una línea base y priorizar acciones en base a peculiaridades preliminarmente identificadas.

v. Diseñar/proponer con base a estas acciones líneas de aproximación específica acorde a su competencia y al derecho indígena y, con base a estos conocimientos/instrumentos, proponer funciones, actividades, perfiles, herramientas metodológicas, estrategia y recursos humanos que intervendrán en el proceso de ejecución del Proyecto, garantizando en adelante el proceso de participación de las autoridades representativas de organizaciones/comunidades indígenas.

b. Potenciar el fortalecimiento de las reparticiones de la SEAM vinculadas directa e indirectamente a la aplicación de leyes e instrumentos estratégicos, tales como los de impacto ambiental, agua, delitos ecológicos, vida silvestre, entre otros relacionados con la protección y defensa de los derechos indígenas a sus recursos naturales y ante eventuales vacíos identificados, realizar esfuerzos necesarios para la generación de instrumentos, protocolos y procedimientos requeridos para el abordaje responsable y

sostenido.

c. Reconocer la importancia de aportar acciones concretas y viables para las comunidades/pueblos Indígenas en función a las conectividades/restauraciones necesarias, de indudable valor para éstas culturas ancestrales desposeídas y para la valiosa biodiversidad remanente.

A fin dar cumplimiento o aplicar en cada caso las leyes y políticas socioambientales de tal suerte a que el proyecto contribuya a la restauración, visibilidad y fortalecimiento de los pueblos indígenas garantizando la plena participación de las instituciones indígenas, autoridades comunales, organizaciones étnicas o interétnicas, en la ejecución del proyecto se tendrá en cuenta:

a. Realización de jornadas de socialización de la política socioambiental con enfoque de derecho; acciones realizables, priorizando la restauración de sus ecosistemas y su relación vital con los mismos; rescate de los patrones de asentamientos y usos.

b. Identificación de los factores/agentes del deterioro y destrucción de la vida silvestre y de alternativas de recuperación del hábitat/vida silvestre fundado en el conocimiento y modelos autóctonos, junto a técnicas apropiadas no indígenas.

c. Planificación de la productividad duradera de los recursos naturales según criterios técnicos y científicos respecto de los daños que ocasionan las practicas extractivas extremas presionadas por demandas del mercado, tales como acopio intensivo de animales silvestres, elaboración masiva de carbón, metros, rajas, praderizaciones, obras varias de infraestructura productiva y vial.

d. Revitalización de las prácticas de subsistencia tradicionales que aseguran la alimentación básica; producción de rubros de consumo o de doble efecto (consumo /venta) cuyo conocimiento tradicional las sociedades Indígenas la tienen, desalentando rubros o actividades no energéticos saludables.

e. Consideración del estamento femenino chaqueño administradora/distribuidora entre otros roles, para la introducción de fuentes de alimentación manejables a nivel de familias extensas, de cara a necesidades nutricionales de la niñez fundamentalmente.

f. Aportes de importancia al manejo duradero de los recursos naturales, tales como, el respeto de la capacidad productiva del suelo, las necesidades energéticas para la cocción de sus alimentos (leña), necesidades de materiales para la construcción de sus viviendas y demás infraestructuras comunales, padrones de asentamientos comunales, parentesco.

g. Reconocimiento de la situación crítica en que se encuentran los recursos naturales y su impacto en las comunidades indígenas, su ambiente, vida

silvestre, uso masivo de agrotóxicos, la destrucción del entorno, la presión del mercado, destrucción progresiva de la biodiversidad, proliferación de incendios, pasturas invasivas, erosión del suelo y pérdida de agua disponible por contaminación, colmatación, salinización.

h. Valoración de las fortalezas de las prácticas Indígenas, de las instituciones sociopolíticas y normativas, su cultura, sistema económico, conocimientos, sus técnicas y sobre todo el buen manejo cultural de sus ecosistemas. Aparecen como indiscutiblemente necesarias:

- La protección de los linderos de las tierras/territorios indígenas con implantación de barreras vivas con especies nativas y cumplimentar instrumentos de mitigación ambiental por parte de los vecinos de las tierras/territorios indígenas.

- La asignación y respeto a los espacios de protección entre áreas de asentamientos humanos y cultivos extensivos, praderas implantadas/invasivas, y otros cultivos intensivos, monocultivos que requieren aplicación de agro-tóxicos.

- La aplicación de normativas y técnicas para la protección y restauración de fuentes/reservorios de agua, humedales incluyendo toma y análisis de muestras periódicas y continuadas.

- La planificación/ampliación del uso de tierras y bosques nativos y en lo posible la recuperación del sistema tradicional aunque ya no se logre a escala efectiva deseable (extrema reducción del espacio físico) y prevención de necesidades futuras (crecimiento demográfico).

Translation of Annex 3

Secretariat of Environment of Paraguay´s Socio-environmental Policy Approach on Human Rights and Indigenous Peoples.

(*Please note this is an unofficial translation of a SEAM document)*

The SEAM promotes a socio-political environmental approach on Human Rights, which incorporates the link between populations and the ecosystems where they live and carry out their social, cultural and economic activities.

Based on this, the project proposal *"Ecosystem Based Approaches for Reducing the Vulnerability of Food Production to the Impacts of Climate Change in the Eastern and Chaco Regions of Paraguay"* would bring a suitable tool to start real recovery,

restoration and conservation processes of native ecosystems and therefore the preservation of indigenous cultures.

If properly applied, this will provide concrete and viable contributions for the preservation of these cultures in respectful interaction with biodiversity, advancing at the same time in the development of liaisons; territorial, socio-political and cultural restoration through their lands, natural resources and ecosystems; and based on their particular autonomies, characteristics and organizations.

In this context, and respecting their rights to participate and to defend their lands and natural resources, it will be necessary to apply a specific and differentiated approach on the design, implementation and monitoring of the restoration dynamics. These processes are expected to imply highly interdisciplinary work with short, medium and long term programs and activities.

Indigenous peoples have not adopted harmful widespread practices while using their natural resources; and is the maintenance of appropriate traditional knowledge and techniques what has enabled the conservation of biodiversity in these ecosystems.

The ILO Convention 169, states the essential relationship between indigenous peoples and their cultural heritage, reiterates and guarantees the importance of to not separate traditional knowledge and practices from their geographical and ecological context. Unfortunately, in circumstances where this sort of knowledge is disassociated from their communities of origin, indigenous cultural resources are more easily commercialized.

The objective of collective rights currently recognized for indigenous peoples is the protection of human dignity, autonomy; their rights to participation, land, territories and natural resources; and public policies that are inclusive, sustainable and based on such rights. This implies the recognition of indigenous (socio-cultural and political) institutions and of the value of its cultural diversity; the recognition and affirmation of their identities and collective relevance of these indigenous peoples, which facilitates the establishment of management channels based on their own guidelines and rhythms, on the management and control of their own members and organizational systems. These recognitions shall in turn allow and guarantee that indigenous organizations and/or communities to be conscious of their respective processes, of the economic, ecological and cultural limits that they consider necessary to establish and preserve.

Consequently, the contribution of environmental initiatives, opportunities and mechanisms should be adequately managed by indigenous organizations and communities; and validated by governments and multilateral agencies.

Policy and Regulations of the Functions of the Secretariat of Environment - SEAM

Indeed, the policy and regulatory functions of the SEAM are based, among others, on:

- **The National Constitution** recognizes the people of Paraguay rights to life in a healthy and ecologically balanced environment; and declares the preservation, conservation and improvement of environment and its link with the integral human development to be of great social interest. It also recognizes the equality of rights and opportunities for all its inhabitants.

- **Law 1561/2000** created the National Environment System (SISNAM for its initials in Spanish), composed by the National Environment Council (CONAM for its initials in Spanish), as a deliberative and advisory body that defines the national environmental policy; and the Secretariat of Environment (SEAM for its initials in Spanish) as an executive body whose main objectives are the formulation, coordination, execution and enforcement of the National Environmental Policy (PAN for its initials in Spanish).

- **Political and strategic instruments** such as the Public Policy Plan for Social Development for All (2010-2020), SEAM Strategic Plan 2009 - 2012, Action Plan for the Conservation of Biodiversity, the National Climate Change Program and its Five-Year Plan 2008-2012, the National Action Plan to Combat Desertification, the National Forestry Action Plan under the Forest Policy workframe, 2010 National Wildlife Protection and Conservation System (SINAVISI for its initials in Spanish), the 2011 National Human Rights Plan. (Axis 1. Transformation of structural inequalities on the exercise of Human Rights and Axis 4. Human Security (Items 5,6,7); others.

- **Laws for the environmental protection, regulation and management,** such as Law 294/93 for Environmental Impact Assessment, Law 751/95 to Combat Illicit Wood Trade, Law 716 against *Environmental Crime,* Law No. 40/90 that creates the *National Commission for the Protection of Natural Resources*, Law No 92/96 - Wildlife Law, Law No. 253/93 which ratifies *The Convention on Biological Diversity*, Law 2515/93 of Climate Change, Law 350/94 on Wetlands, Law No 536/95 Forestation and Reforestation, Law No 970/96 that ratifies the *Convention on Desertification*, Law No 816/96 on *Measures for the Defense of Natural Resources*, Law No 3239/07 on Water Resources, Law No 1328/98 on Copyrights.

The guarantees of indigenous rights were established in the National Constitution (Chapter V), Law No. 234/93 which ratifies the ILO Convention 169, Law No. 904/81 Statute of Indigenous Communities, whose enforcement authority is the SEAM, as relevant. The legal and policy basis on indigenous law and on its institutions of natural resources defense and protection are more specifically established under:

- **1992 National Constitution (CN for its initials in Spanish). Chapter V on Indigenous Peoples and ethnic groups. Article 65.** It is guaranteed for indigenous peoples to have the right to participate in the economic, social, political and cultural life of the country, in accordance with its customary practices, this Constitution and national laws. Section 66. The State shall respect the cultural peculiarities of indigenous peoples (...) It will additionally act on its defense against

demographic decline, predation of their habitat, environmental pollution (...).

- **Law 904/81. Statute of Indigenous Communities (ECI for its initials in Spanish).** Article 1. The objective of this Law is the social and cultural preservation of indigenous communities, defense of their heritage and traditions, improvement of their economic conditions, their effective participation in the national development process and their access to a legal system that guarantees their ownership of land and other productive resources under equality of rights with other citizens. Article 7. The state recognizes the legal existence of indigenous communities (...).

- **Law 234/93 which ratifies ILO Convention 169 on Indigenous Peoples.** Article 7.7.4. Governments shall take measures, in cooperation with the peoples concerned, to protect and preserve the environment in those territories that they inhabit. Article 15.1. The rights of the peoples concerned to natural resources in their lands shall be specially safeguarded. These rights include the right of these peoples to participate in the use, management and conservation of these resources.

- **Law 1328/98 on Copyright and Related Rights**. Article 83. Published or non-published expressions of Folklore will be permanently protected from inappropriate exploitation, reproduction or distortion. It is responsibility of the State, through the National Directorate of Copyrights and other institutions in charge of the traditional Cultural Heritage, to defend these against abusive exploitation attacks to their integrity.

- **The UN Declaration on the Rights of Indigenous Peoples (2007)** Article 29. Indigenous peoples have rights to the conservation and protection of the environment and the productive capacity of their lands or territories and resources (...) Article 39. Indigenous peoples have the right to financial and technical assistance from States and through international cooperation to access the rights set forth in this Declaration.

Issues to Consider

Consequently, the SEAM under its jurisdiction, based on its socio-environmental policy focused on human rights, and being the regulatory enforcement authority on indigenous rights concerning ecosystems and natural resources restoration contemplates the following:

a. The old/current indigenous ownership/ existence is equal to the respectful interaction with biodiversity and to advance towards the restoration or connectivity across communities, land/natural resources of indigenous peoples, some still settled in their traditional places, but mostly in processes claims and management related to legalization of their lands / territories:

vi. To understand that the indigenous communities are autonomous entities with their own authority system and that they are governed on the basis of customary rights and specific laws other than those of the other actors/groups involved in the project; consequently, to enter the corresponding component/section that recognizes such characteristics and rights, and to proactively organize them.

vii. To inform authorities of the representative indigenous organizations of the area about the Project (Objectives, Scope, Methodology, Role/institutional competency).

viii. To develop the indigenous component and/or strategy of the Project based on a responsible and consistent approach to issues concerning the rights and culture of Indigenous Peoples.

ix. To produce updated information on the health status of indigenous natural resources or ecosystems, land use, based on satellite imagery and other sources to establish a baseline and prioritize actions based on peculiarities preliminarily identified.

x. To design/propose specific approach guidelines based on these actions and these knowledge/tools, and according to indigenous jurisdiction and rights, to propose functions, activities, profiles, methodological tools, a strategy and human resources that will intervene in the Project implementation process, guaranteeing hereafter the participation process of official representatives of indigenous organizations/communities.

b. To promote the strengthening process of SEAM's departments directly and indirectly linked to the implementation of strategic laws and legal instruments, such as those responsible for the areas of environmental impact, water, environmental crime, wildlife, among others related to the protection and defense of indigenous rights natural resources and to any gaps identified, efforts are needed for the generation of tools, protocols and procedures required for a responsible and sustainable approach.

c. To recognize the importance of providing concrete and viable actions to indigenous communities/peoples according to the necessary connectivity/restorations, which are of evident value to these deprived ancient cultures and for the remaining valuable biodiversity.

In order to enforce or apply in each case the social and environmental laws and policies, to ensure the Project's contribution to the restoration, visibility and strengthening of indigenous peoples, guaranteeing the full participation of indigenous institutions, community leaders, ethnic or interethnic organizations in project implementation; the following will be considered:

i. Performing socialization activities about social and environmental policy with a human rights approach, actions which may be achieve by prioritizing the restoration of their ecosystems and their vital relationship with them; and the recovery of settlement patterns and their uses.

j. Identification of wildlife deterioration and destruction factors/agents and of habitat/wildlife restoration alternatives, based on autochthonous knowledge and models, along with appropriate non-indigenous techniques.

k. Sustainable planning for natural resources productivity, based on technical and scientific criteria on the damages caused by extreme extractive practices, pushed by market demands, such as intensive collection of wild animals, massive carbon production, measures, gaps, logging, various productive and traffic infrastructure works.

l. Revitalization of traditional subsistence practices that ensure basic nutrition, consumption or double effect (consumption/sale) commodities production that exists in the traditional knowledge of indigenous societies, so that the production of unhealthy or non-energetic commodities is discouraged.

m. Consideration of the female management/distributor figure of Chaco, among other roles, for the introduction of food sources that are manageable (at the extensive family level), given the nutritional needs of mainly in children.

n. Important contributions to the sustainable management of natural resources, such as respect for the productive capacity of the soil, the energy needs for cooking their food (firewood), material needs for the construction of their homes and other community infrastructure, communal settlement patterns, and kinship.

o. Recognition of the critical situation of natural resources and its impact on indigenous communities, their environment, wildlife, massive use of agrochemicals, landscape destruction, market pressure, progressive destruction of biodiversity, proliferation of fires, invasive grasses, soil erosion and loss of available water by pollution, siltation, and salinization.

p. Valuation of the indigenous practices strengths, of socio-political and regulatory institutions, their culture, economic systems, knowledge, their techniques, and especially of the proper cultural management of their ecosystems. The following have proven to be evidently necessary:

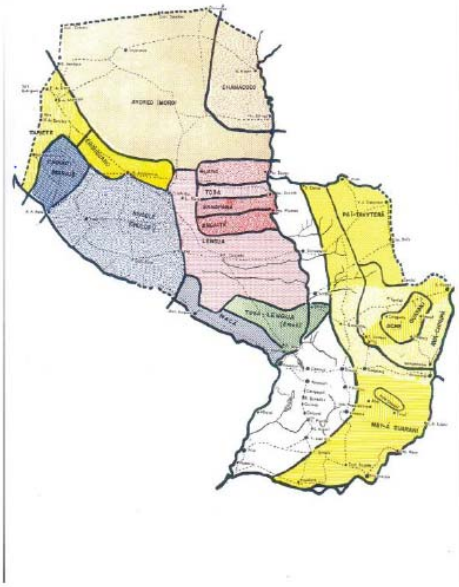
- The protection of indigenous lands/territories' boundaries through the plantation of hedgerows with native species and complemented with environmental mitigation tools, by neighboring land owners indigenous lands/territories.

- The allocation and respect for the protected zones between human settlements areas and extensive plantations, implanted/invasive pastures, and other intensive plantations, monocultures that require the application of agro-chemicals.

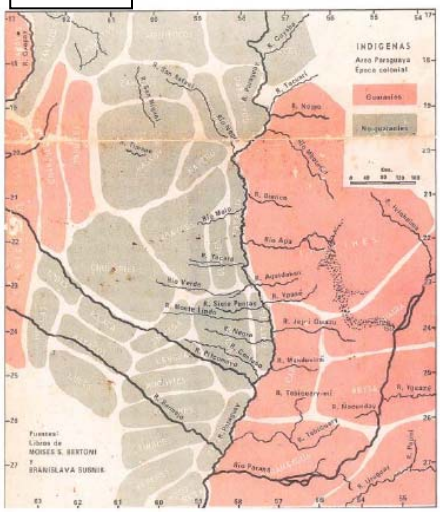
- The application of standards and techniques for the protection and restoration of water sources/reservoirs, wetlands, including periodic and continued sample collection and analysis.

- The planning/extension of the use of native land and forests, and where possible, the recovery of the traditional system, even when the expected effective levels can no longer be achieved (extreme reduction of physical space) and prevention of future needs (demographic growth).

Map A



Map B

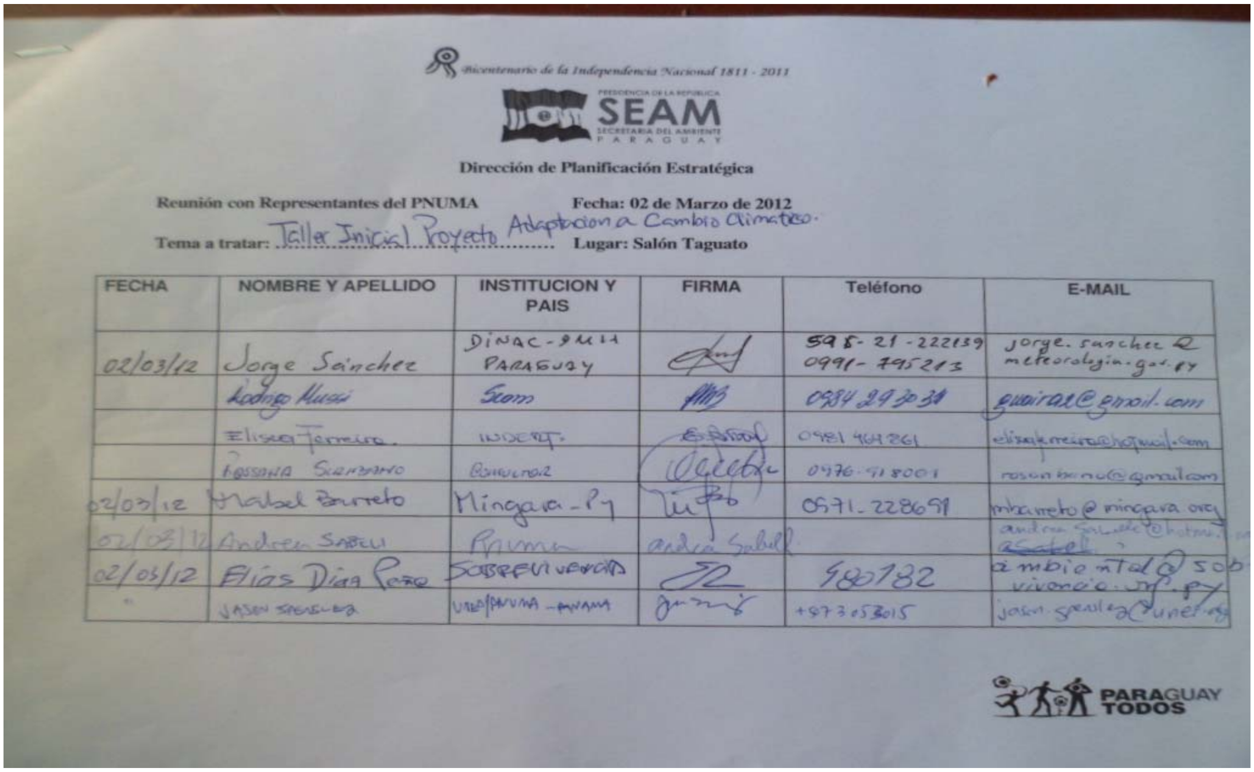


- Map A Current indigenous territories of Paraguay.
- Map B Indigenous territories during colonial times in Paraguay

Source: Bejarano, R. 1977. IGM-MEC. Paraguay

Annex 4 Workshop Sign-in Sheets

Workshop A: Initiation and Consultation of the Project among National Ministries and Agencies, March 2, 2012, Asunción, Paraguay



Bicentenario de la Independencia Nacional 1811 - 2011

SEAM
Presidencia de la República
Secretaría del Ambiente
PARAGUAY

Dirección de Planificación Estratégica

Reunión con Representantes del PNUMA   Fecha: 02 de Marzo de 2012

Tema a tratar: Taller Inicial Proyecto Adaptacion a Cambio Climatico.   Lugar: Salón Taguato

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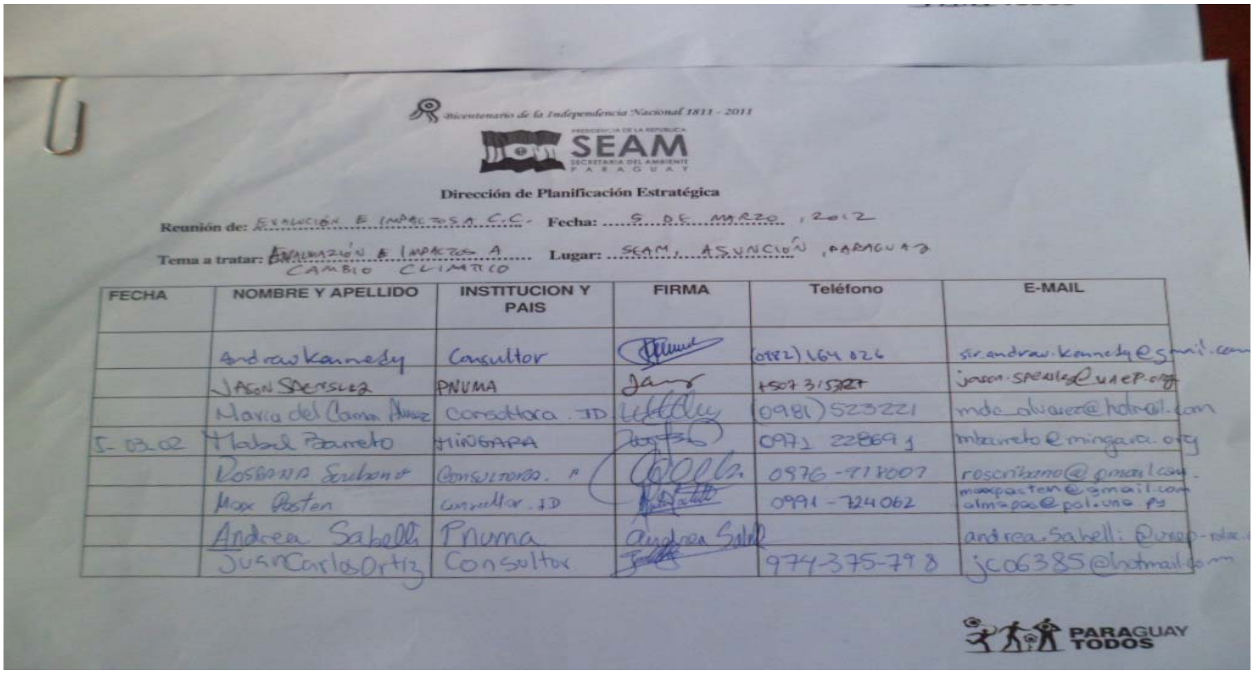
PARAGUAY TODOS

Workshop B: Climate Change Vulnerability and Impact Assessment methods and workplan, March 5, 2012, Asunción, Paraguay



Bicentenario de la Independencia Nacional 1811 - 2011

SEAM
Secretaría del Ambiente
Paraguay

Dirección de Planificación Estratégica

Reunión de: EVALUCIÓN E IMPACTOS A C.C. Fecha: 5 DE MARZO, 2012

Tema a tratar: EVALUACIÓN E IMPACTOS A CAMBIO CLIMATICO Lugar: SEAM, ASUNCIÓN, PARAGUAY

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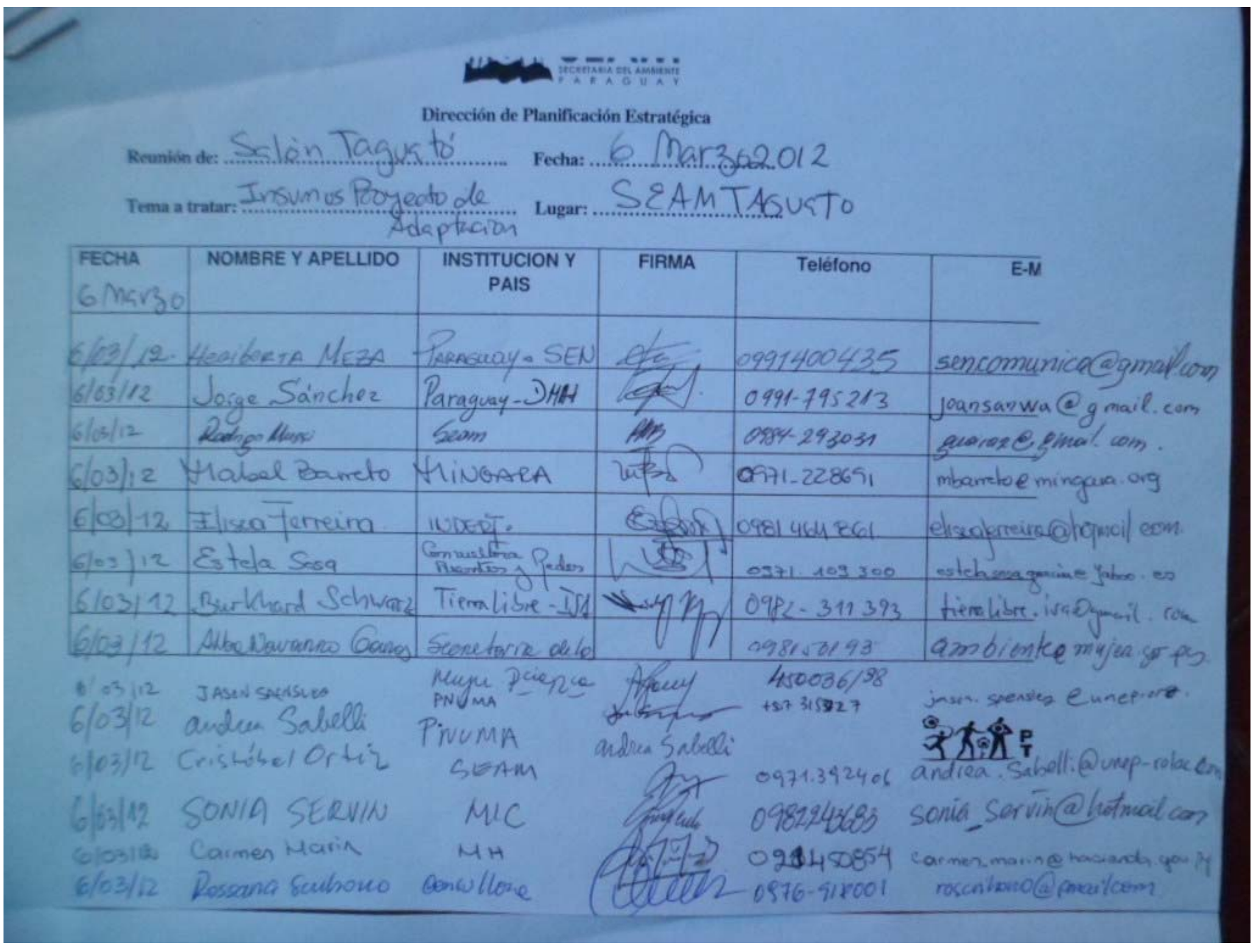
PARAGUAY TODOS

Workshop C: Inputs to Project Concept Design, March 6, 2012, Asunción, Paraguay



Secretaría del Ambiente
Paraguay

Dirección de Planificación Estratégica

Reunión de: Salón Taguató Fecha: 6 Marzo 2012

Tema a tratar: Insumos Proyecto de Adaptación Lugar: SEAM TAGUATO

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